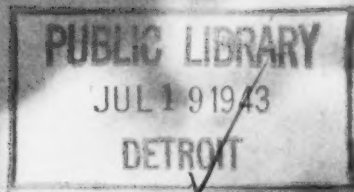


PHOTOLOGY DEPT.

COAL AGE

JULY 1943



WAR BONDS
AND STAMPS
FOR VICTORY



VARNISH *like this*
VANISHES

with **SUN SOLNUS OILS**

Stop Sticking Of Compressor Valves . . . Reduce Downtime

The unretouched photograph above shows what happened to the valves of an air compressor operating in one of America's largest anthracite mines. The varnish-like, gum deposit caused sticking of valves and necessitated frequent shut-downs for cleaning, wasting valuable production time and adding greatly to the cost of maintenance. But the varnish trouble vanished when they changed from a competitive lubricant to Solnus Oils.

Now compressors throughout the mine are running without "gum trouble" . . . shut-downs have been reduced to a new low . . . and valuable production time

has been saved with Solnus Heavy Medium Oils. More proof of the value of these wholly distilled lubricants in keeping piston rings free . . . valves clean . . . and compressors running at peak efficiency.

Whatever the lubrication problem that may confront you in your mine there's a Sun Mine Lubricant to answer it . . . and a Sun Oil Engineer—one of those "Doctors of Industry"—to help you solve it. Let this production increasing team help you turn out more tons per day. Write . . .

SUN OIL COMPANY • Philadelphia

Sun Oil Company, Limited, Toronto, Canada

SUN INDUSTRIAL PRODUCTS

tech



HELPING INDUSTRY HELP AMERICA

In war or peace
B.F. Goodrich
FIRST IN RUBBER



B. F. Goodrich survey saves money for V-belt users

Idle machine time reduced; replacement inventory adjusted; extra rubber released for other uses.

WHAT happens when a V belt wears out in a typical large plant? Often there's no replacement in stock. A machine is idle until the right size belt can be ordered and delivered. Or if the serial number of the worn belt can't be read, a replacement is ordered by guesswork — and frequently doesn't fit. Time and money are wasted while machines are idle.

The other extreme is the plant operator who eliminates guesswork by carrying a replacement for every belt in the plant. He stocks 10 belt replacements for 10 machines using the same size, even though a reserve of 3 or 4


would be sufficient. Rubber is unconsciously hoarded, and money needlessly tied up in inventory.

The B. F. Goodrich Company has developed a plan for taking the guesswork out of belt replacement and inventory. Here's how it works when a B. F. Goodrich distributor puts it into effect.

He surveys the entire plant, listing each machine by serial number, and noting the size and number of V belts used on every unit. This information is posted in the stockroom.

He analyzes the list, tabulating the machines that use the same size single

belts or matched sets. Then he and the plant operator determine the right replacement inventory — neither too small nor too large. When a machine operator goes to the stockroom for a belt he gives the serial number of the machine and gets the *right* replacement *immediately*. No guesswork. No costly delay.

Such a survey in your plant may help reduce machine idleness and adjust oversized or undersized inventories. For full information just write *The B. F. Goodrich Company, Belting Dept., Akron, O.* 

B.F. Goodrich
 RUBBER and SYNTHETIC products

Never before such a job for a



HULBURT
QUALITY GREASE

And never before such vital reasons for the Coal Mining Industry to make the most of their present equipment to get out the tonnage necessary to win this war! . . . Hulburt provides the **QUALITY** that prevents breakdowns: the **QUALITY** that keeps machines and cars at the peak of their efficiency . . . It's the one and only grease made exclusively for coal-mine equipment.

HULBURT OIL & GREASE COMPANY

Specialists in Coal Mine Lubrication

PHILADELPHIA . . . PENNSYLVANIA



HULBURT

QUALITY

Lubricant

QUALITY

QUALITY

QUALITY

QUALITY

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QUALITY GREASE

**SPECIFY HEAVY-DUTY PHILCO BATTERIES
...THEN WATCH LOCOMOTIVE PERFORMANCE!**



**PHILCO BATTERY ENGINEERING GIVES YOU POWER
FOR GREATER TONNAGE AT LOWER COST**

TODAY, when the demands of war call for greater and greater tonnage, you need locomotive batteries with the extra wallop... high capacity... absolute reliability to keep mine production at peak figures. You get that kind of battery performance in a heavy-duty Philco—and you get it hour after hour, day after day! It's built into every cell! In a Philco you get the famous Floté grid design for low

internal resistance... "K" Process plates for sustained high voltage and extra capacity... Triple Insulation for long productive life. These and many other features of Philco advanced construction and modern design add up to the most efficient battery you can buy for today's mine service. For complete information and specifications, write for the latest Philco Mine Battery Catalog.



**PHILCO CORPORATION, STORAGE BATTERY DIVISION
TRENTON, NEW JERSEY • Sales Agents in 109 Cities**

Replace with **PHILCO** *Mine Batteries*

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VOLUME 48

JULY, 1943

NUMBER 7

COAL AGE

COAL AGE (with which is consolidated "The Colliery Engineer" and "Mines and Minerals") is published monthly on the 1st. Allow at least ten days for change of address. All communications about subscriptions should be addressed to the Director of Circulation, Coal Age, 330 West 42d Street, New York, 18, N. Y.

Subscription rates: United States, Mexico, Central and South America, \$3 for one year, \$4 for two years, \$5 for three years, Canada, \$3.00 for one year, \$5 for two years, \$6 for three years, Great Britain and British Possessions, 30 shillings for one year, 60 shillings for three years. All other countries, \$5 for one year, \$10 for three years. Single copies, 35 cents each. Entered as second-class matter Oct. 14, 1936, at the Post Office at Albany, N. Y., under the Act of March 3, 1879. Printed in the U. S. A. Cable Address: "McGraw-Hill, N. Y." Member A.B.P. Member A.B.C.

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330 West 42nd Street, New York, N. Y.

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Please change my address on Coal Age

From

To

Signed

COMING COAL AGE ATTRACTIONS

• Preventive maintenance, with especial emphasis on work done to make machines more suitable for high production rates, is the subject of an article on practices at the Federal No. 1 mine, Koppers Coal Division, in northern West Virginia. Chapter and verse are given on a number of changes in loading machines at this particular operation to improve performance, along with certain testing methods and equipment. Most of the machines are served by shuttle cars. The article is scheduled for August.

• Operation of mechanical-mining equipment, as well as its maintenance, stands high on the Coal Age agenda for the future. In addition to articles under way, Coal Age editors now are touring several coal fields to gather data on some of the latest developments in mechanical work with both conveyors and mobile loading machines for future publication. Their schedules also include inquiry into new or improved developments in all other phases of mine operation, preparation and maintenance.

• Another in Coal Age's series of articles and methods used in stripping outcrops, particularly in the East, has been scheduled for the coming issue. It will detail the equipment and methods employed by the F. B. Wood Coal Co., Barnesboro, Pa. Ideas on shaft escapeways and methods of warming shaft bottoms are detailed in other material on hand for early publication. And August will carry Charles R. Drum's article on the use of rectifiers by the Vesta-Shannopin Coal Division, Jones & Laughlin.

SAVE TIME

with these Steel Ties

Save a few minutes here and a few there throughout your mine operations and before you know it the total saving will appreciably help to swell Victory tonnages. Here, for example, is one operation in which time-saving is definitely possible in many mines.

Instead of the usual time-consuming work involved in laying track with wooden ties, you can speed up assembly of track sections by using Bethlehem Steel Ties.

Bethlehem Steel Ties have riveted clips that lock the rails rigidly in place and provide permanent gaging for the track. A hammer blow on each clip is all that's needed to do the job. And when sections are dismantled, the operation is equally quick and easy. Each clip is simply unlocked with a hammer blow, and the tie is removed, and ready, good as new, for service again. It's not unusual for Bethlehem ties to be installed and removed for use elsewhere as many as forty times.

Ask for folder No. 475 showing the improvements in Bethlehem Steel Ties.



OTHER BETHLEHEM PRODUCTS FOR MINES



Rails • Frogs, Switches, Switch Stands, Turnouts, and Special Trackwork • Track Bolts, Nuts and Spikes • Mine Cars, Wheels, Axles • Bars, Plates, Structural Shapes • Steel Construction • Steel Timbering • Pipe, Boiler Tubes • Galvanized Roofing, Siding • Wire Rope, Strand • Drill Steel.



COALMASTER

Tools

**RUN
SMOOTHLY
AND
SPEED UP
DRILLING**

Our representatives are drilling specialists—men trained by experience to select the tools that will best meet your particular requirements. They are all eager to help you solve your drilling problems. Why not avail yourself of their cost-free services.

★ These tools are accurately aligned from threadbar to tool point. That means COALMASTER TOOLS run smoothly and give workers time to relax while the drill does the work. The safety angle is an important factor that appeals to drillers. Mines are doing their fastest drilling since they standardized on COALMASTER. The coal is broken and chipped out, not pulverized.

Among the important benefits you will find are—faster breaking action—elimination of coring—reduced vibration—less costly auger bit breakage—lower power cost—minimum auger wear—less labor, strain and tension for the driller—straight holes drilled without choking—and COALMASTER is made in sizes to drill desired holes for all powder, CARDOX, AIRDOX, Hydraulic and special requirements.

COALMASTER

**BLAST HOLE
DRILLING**

Tools

CENTRAL MINE EQUIPMENT CO.
ST. LOUIS, MO.



5 PLANES FOR
ORDINARY WIRE

Listen to the Philharmonic Symphony Program over the CBS network Sunday afternoon 3:00 to 4:30 E.W.T. Carl Van Doren and a guest star present an interlude of historical significance.

*REG. U. S. PATENT OFFICE

UNITED STATES

July, 1943 • COAL AGE

1 PLANE FOR U. S. LAYTEX* ASSAULT WIRE



Time is one of our best allies. The faster we can get men and material up to the front, the sooner the war will be won... our fighting men return. That's why transport planes are playing a bigger and bigger part in the Service of Supply... and why Laytex Assault Wire fits ideally into the picture of air transport.

Laytex Assault Wire—made especially for front-line service—requires only 1/5 the space in transport of ordinary communications wire. If Laytex Assault Wire had not been developed and ordinary wire had to be shipped for the same use, by air, four additional planes would be required for transport... planes needed for men,

medical supplies, food... whatever must reach the front in a hurry.

Laytex Assault Wire resists concussion and a wide range of temperature changes. It is strong, tough, will not abrade or peel excessively. Laytex is highly flexible. It is waterproof and is closely bonded to accurately-centered electrical conductors. All these qualities are the inevitable result of the unique Laytex Process which applies the compounded, purified insulation in liquid form.

Laytex Assault Wire weighs less than 30 lbs. per mile; has a breaking strength greater than 50 lbs. per conductor; a talking distance of more than five miles.

Laytex ASSAULT WIRE
REG. U. S. PAT. OFF

FREES 4 PLANES FOR EMERGENCY TRANSPORT

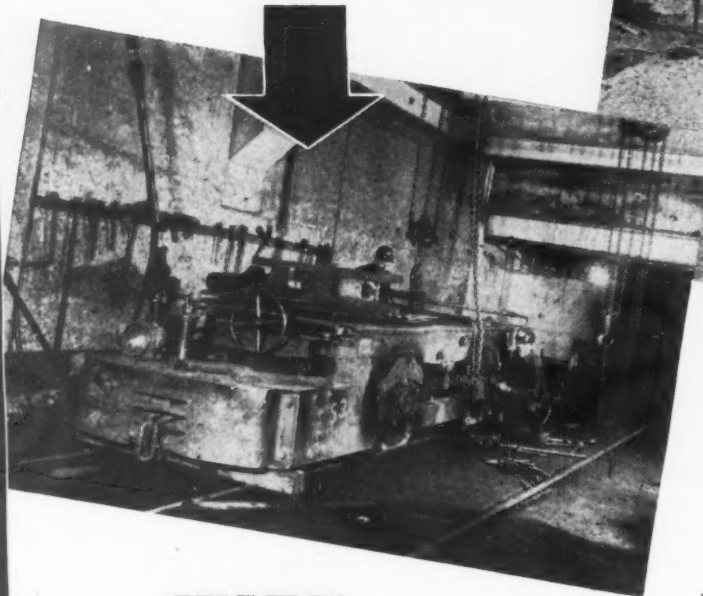


1230 SIXTH AVENUE

ROCKEFELLER CENTER • NEW YORK

RUBBER COMPANY

LESS OF THIS



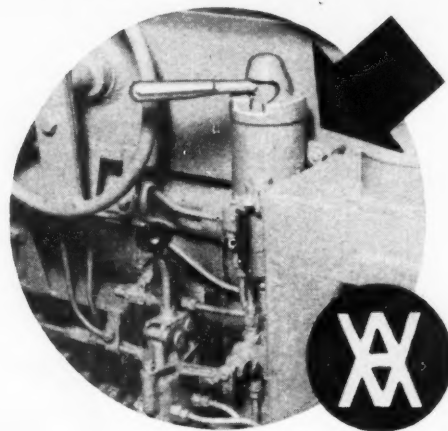
MORE OF THIS

... WITH
WESTINGHOUSE *Hydraulic Brakes*

A VAILABILITY of small locomotives is increased when they are equipped with Westinghouse Hydraulic Brakes. They spend more productive time at the mine—less idle time in the shop.

The Hydraulic system provides power for braking that is responsive, adequate, and flexible. Manipulation is simple and effortless. A locomotive can be kept under control at all times without recourse to partially set hand brakes or motor "bucking". Abnormal wear on mechanical elements, and damaging shocks to electrical apparatus, are thus prevented. Maintenance expense is drastically reduced, time out for repairs minimized, serviceability of equipment enhanced.

The Westinghouse Hydraulic Brake is a simple, compact system, easily installed on new or old locomotives, where space limitations preclude use of Air Brakes.

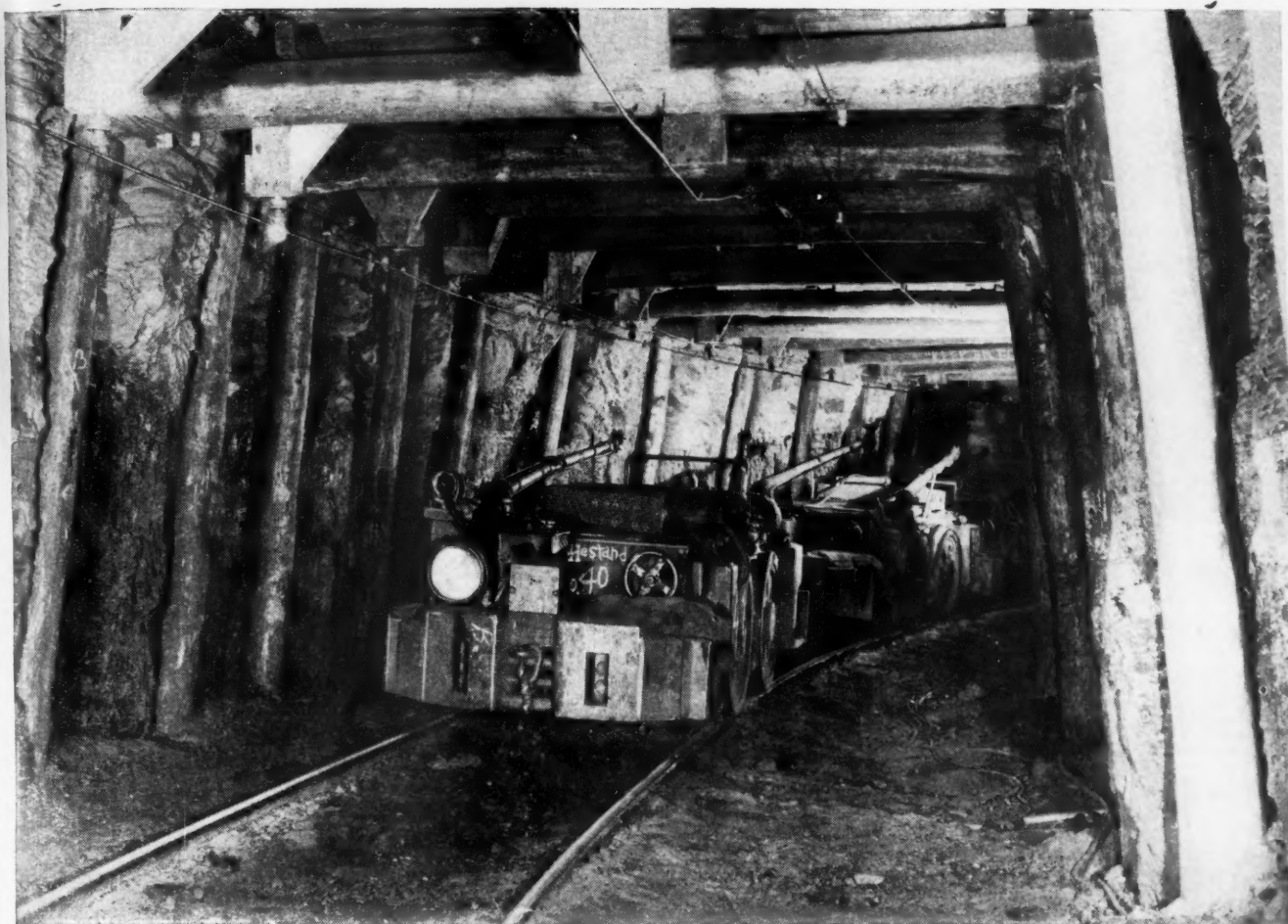


Pressure development with the Hydraulic Brake is directly proportional to the degree of operating handle movement. Any required braking intensity can be attained quickly and accurately . . . Ample power and flexible control facilitate spotting of cars at loaders, and permit heavy haulage down grade at time-saving speeds, safely. • •

WESTINGHOUSE AIR BRAKE CO.

Industrial Division

PITTSBURGH, PA.



AVOID HAULAGEWAY DELAYS

The first step in the production of many vital war products starts with coal. And the first step many mine management men take to assure top production, eliminate time-wasting tie-ups and accidents is to specify "CZC"-treated timbers.

This "safety" construction is shown in the photograph above. Chromated Zinc Chloride-treated ties, props and lagging keep this haulageway safer. Construction failure here could cause a serious production bottleneck. It would leave miners idle and put a heavy burden on busy maintenance crews.

Since "CZC"-treated timbers last many times longer than untreated timbers, maintenance problems are reduced. The reason is simple: "CZC"-treated wood resists decay.

And here are two important *extra* advantages you get with "CZC"-treated wood:

It is highly resistant to fire
It is odorless and clean to handle

To keep your mine going at top efficiency, reduce accidents and cut maintenance costs and man-hours, specify "CZC"-treated timbers. There is ample preservative and treating capacity to meet both military and essential mining needs.



CZC

CHROMATED ZINC CHLORIDE
WOOD PRESERVATIVE

Get all the facts on "CZC"-treated wood. See how its cost is rapidly amortized by eliminating early and frequent replacements. Write for "Wood Preservation for Mines." E. I. du Pont de Nemours & Co. (Inc.), Grasselli Chemicals Dept., Wilmington, Delaware.

BETTER THINGS for BETTER LIVING . . . THROUGH CHEMISTRY



Magic for

TEXACO MAINTENANCE LUBRICATION CHART G. E. MINE HAULAGE LOCOMOTIVE

PROPER LUBRICATION REDUCES MAINTENANCE AND REPAIRS. — PROLONGS THE LIFE OF A LOCOMOTIVE. THE RECOMMENDATION BELOW APPLY FOR AVERAGE CONDITIONS. — WHEN SERVICE IS UNUSUALLY SEVERE, LUBRICATION SCHEDULES SHOULD BE CHANGED ACCORDINGLY. ALWAYS USE CLEAN LUBRICANTS AND CLEAN THE FITTINGS BEFORE APPLYING THE LUBRICANT.

MOTOR-AXLE BEARINGS

TEXACO 747 OIL
MAINTAIN DAILY AN OIL LEVEL OF ABOUT THREE & A HALF INCHES IN AUXILIARY OIL WELL. STIR UP PACKING WHEN GLAZED. RENEW WASTE PACKING WHEN REQUIRED.
PLAIN BEARINGS ALSO WASTE PACKED
PLAIN & ANTI-FRICTION BEARINGS
TEXACO REGAL STARFAK NO. 2
CHECK EVERY WEEK

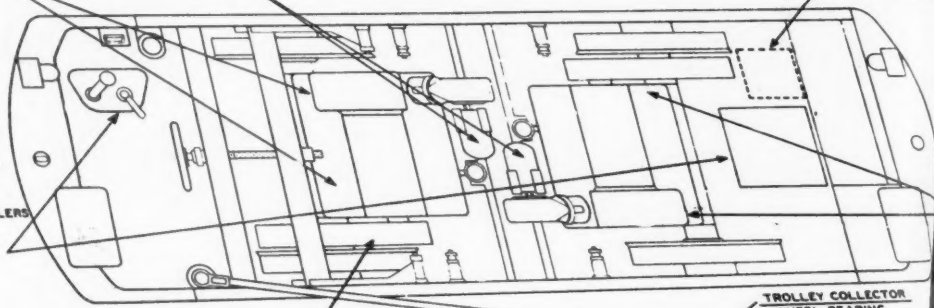
CONTROL APPARATUS

- A. CONTRACTS OF THE SLIDING SEGMENT OR DRUM TYPE — WIPE CLEAN ONCE A MONTH, OR EVERY INSPECTION PERIOD AND RELUBRICATE WITH **TEXACO PETROLATUM**
- B. THROTTLE SWITCH PINS, BUSHING, ROLLERS
TEXACO TEXOL "D"
ONCE A MONTH
- C. REVERSER HINGE PIN
TEXACO CETUS OIL
1-2 DROPS MONTHLY
- D. REMOTE REVERSER
1- OILITE BUSHINGS
TEXACO TEXOL "D"
1-2 DROP MONTHLY
- E. BEARINGS
TEXACO REGAL STARFAK NO. 2
1-2 TURNS MONTHLY

BLOWER MOTORS

TEXACO REGAL STARFAK NO. 2
CLEAN & REPACK MOTOR BEARINGS AT LOCOMOTIVE OVERHAUL PERIOD

LOCOMOTIVES EQUIPPED WITH COMPLETE UNIT OF AND KEEP OIL LEVEL FROM TOP OF FILL. **TEXACO TEXOL** SEPARATE COMP. CLEAN & REPAK

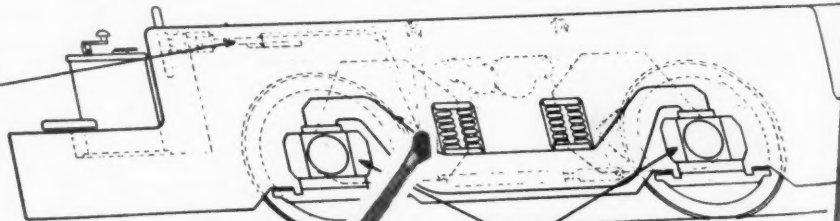


SPUR
TEXACO CRATER NO. 2
CHECK MONTHLY

GEARS
HERRINGBONE SPIRAL-BEVEL
TEXACO TEXOL "H"
CHECK MONTHLY

TROLLEY COLLECTOR
WHEEL BEARING
TEXACO TEXOL "D"
1-2 SQUIRTS EVERY SHIF
SLIDES
TEXACO 904 GREASE
EVERY SHIF

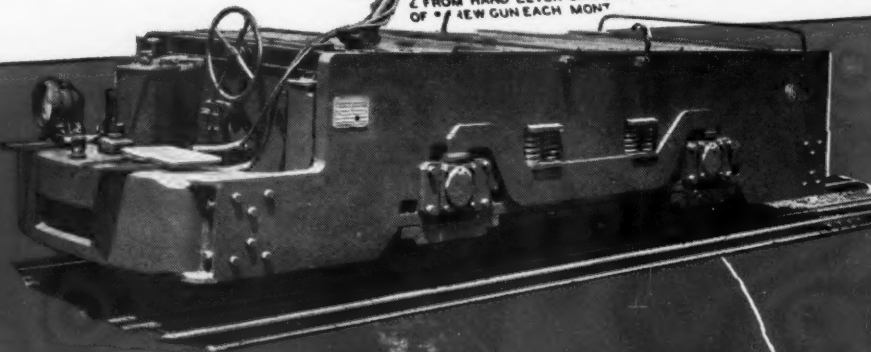
HAND BRAKE SCREW
TEXACO 904 GREASE
WHEN REQUIRED



JOURNAL BOXES

ROLLER OF
TEXACO 747 OIL
CLEAN
JOUR
TEX
STARFAK NO. 2
REPACK FROM 1-2 YEARS
ANTI-FRICTION
REGAL STARFAK NO. 2
FROM HAND LEVER OR POWER GUN
OF NEW GUN EACH MONTH

WASTE PACKED
TEXACO 747 OIL
SATURATE WASTE DAILY
STIR-UP PACKING WHEN GLAZED
RENEW WASTE WHEN REQUIRED



Full-size 12" x 18" Charts are available covering prominent makes of underground machinery. Order by make and model today, using Company letterhead, please.

Touch More Tonnage!

Going into the last half of the year for the greatest tonnage in history, the coal mining industry will require maximum output from each piece of mechanized equipment. The magic touch for this maximum output is—the right lubricant in the right place at the right time.

Coal operators everywhere are providing this magic touch to their cutters, loaders, locomotives, etc., by following *Texaco Maintenance Lubrication Charts*. Worked out with prominent equipment makers, *Texaco Lubrication Charts* (12" x 18" in size) show exactly *where, when, and with what* lubricant to service each lubrication point of your cutters, loaders, locomotives . . . with lubricants approved by the manufacturer.

Texaco Charts at all lubricating stations for your men to follow will help to assure maximum life from your equipment and less time out for repairs. Order by make and model from—

The Texas Company, *National Sales Division, Department C*,
135 East 42nd Street, New York, N. Y.



TEXACO Lubricants

FOR THE COAL MINING INDUSTRY

Power for COAL



ROEBLING

When You Need It, Let "AR" Be Your Friend

. coal for POWER

ROEBLING WIRE PRODUCTS

MOVE THEM BOTH

for Victory!

600,000,000 tons of coal in 1943! As a handy scale to gage the size of America's effort for all-out Victory, keep that figure in mind. *Six hundred million* tons of heat for homes—coke for steel—chemicals for explosives: six hundred million tons of power for Victory!

Producing that prodigious amount of fuel for America at war is a job that takes everything the 600,000 men on the coal front can give it! Strength and courage and skill and initiative—and the help of the finest equipment America's industries can produce.

Roebbling "Blue Center" Steel Wire Rope, Roebbling Electrical Wires and Cables—both are helping to carry the load, moving power into America's mines, taking coal out. Electrical wires on transmission lines, at sub

stations, on mining machines . . . Wire rope on shaft hoists, inclines, aerial tramways . . .

Nor are these Roebbling's only contributions to the steady flow of power for America's industries. On giant cranes that handle coal at loading and distribution points, Roebbling "Blue Center" Steel Wire Rope continues its service—and Roebbling Electrical Cables again carry the power. On ships and power barges, at power plants and war factories—wherever war goods are moved or used, one or both of these Roebbling products is on the job, helping to exchange coal for power, power for coal . . .

Your nearest Roebbling office or Roebbling Distributor is ready to put these products to work for you. Ready to put to work with them too the experience gained in supplying the needs of America's hundreds of industries—and the knowledge gained in constant striving to give those industries better Roebbling Wire Products all along.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON, NEW JERSEY

Branches and Warehouses in Principal Cities

*Electrical Wire
AND Cable*

*"Blue Center"
WIRE ROPE*

Pacemaker in Wire Products

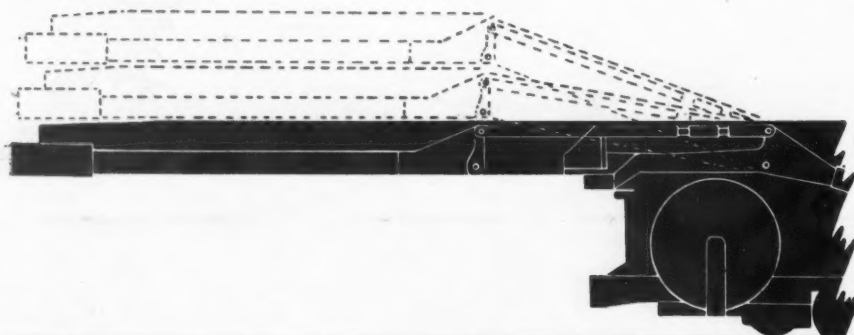
★ Why You Need The "Automat" Parallel Lift Rear Conveyor—



★ You need the "Automat", with its parallel lift rear conveyor, to take full advantage of seam height because it is the only Mechanical loader with a rear conveyor and discharge end—ON THE LEVEL AND ALWAYS PARALLEL TO TRACK AT ALL ELEVATIONS.

The photo above illustrates this worthwhile advantage of the "Automat" clearly. The drawing below shows you the parallel-to-track-at-all-elevations action.

Regardless of height of car, when the "Automat" rear conveyor is raised to loading position by its easily operated hydraulic lift, loading end automatically remains parallel to track. Don't overlook the real advantages of this feature in limited head room for maximum production.



Here Is The Way To Find Height Available For Passage of Coal Over The "Automat's" Exclusive Parallel Lift Rear Conveyor.

First—Add 5" (space from bottom of conveyor frame to carrying surface) to height of loading end of car from top of rail. Second—Deduct this total from seam height, measured from rail to roof. The answer will be height from carrying surface of conveyor to roof at any point on the "Automat" rear conveyor. Check this for possible increase in haulage capacity of your cars. Myers-Whaley Company—173 Proctor Addn., Knoxville, Tennessee.

MYERS-WHALEY

Mechanical Loaders Exclusively for over 35 years

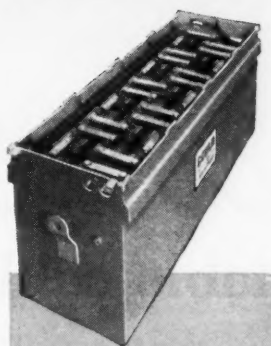


CUSTOM BUILT WITH MASS PRODUCTION ACCURACY

● Most industrial storage batteries are designed and made for a particular job. They are not mass produced in quantity. However, certain mass production techniques worked out by Gould engineers have been applied to many important steps in the manufacture of Gould industrial batteries. These have resulted in greater uniformity of product and a higher standard of quality.

For instance, the Gould grid casting machine pictured here has upped production from approximately 2,000 per day for the hand casting operation to 5,000 per day per machine, and the finished product is better.

When your industrial battery is Gould designed and Gould manufactured, it is a guarantee of longer battery life and more economical operation.



SPECIFY GOULD KATHANODE
The original spun glass
battery tested by 20
years of actual service.

Rated Conservatively . . .
Goulds equal or exceed in
capacity any battery of
comparable size and cell
structure.

GOULD STORAGE BATTERY CORPORATION, DEPEW, NEW YORK

Builders of industrial batteries for every application. Sales and service offices in principal cities of the U.S.A.

Factories at Depew, N. Y., North Bergen, N. J., Dallas, Atlanta, Chicago, St. Paul, Leavenworth, Los Angeles



FOR EXCELLENCE IN STORAGE BATTERY PRODUCTION AT DEPEW PLANT

GOULD

Since 1898 THE BATTERY PICKED BY ENGINEERS

DON'T OVERTAX YOUR BATTERY

*One of a series of service suggestions
for users of industrial batteries.*

► Your storage battery is made to do a specific job, and its manufacturer rated it accordingly—so many ampere hours at the 8 or 6-hour rate, as the case may be. It is an accepted practice to work a battery to its full capacity. Regular full capacity discharges keep a good battery “awake”, and actually stimulate its action so that it performs well for a long trouble-free life.

But here's the “But”: Don't overwork any battery consistently. Don't discharge, as a matter of routine, beyond the rated capacity of the battery unit. Goulds can and will give more than rated capacity and will do so continuously for a long period of time. However, when discharges are carried beyond the point of rated capacity, an unusual strain is imposed on grid members, and this strain tends to shorten grid life.

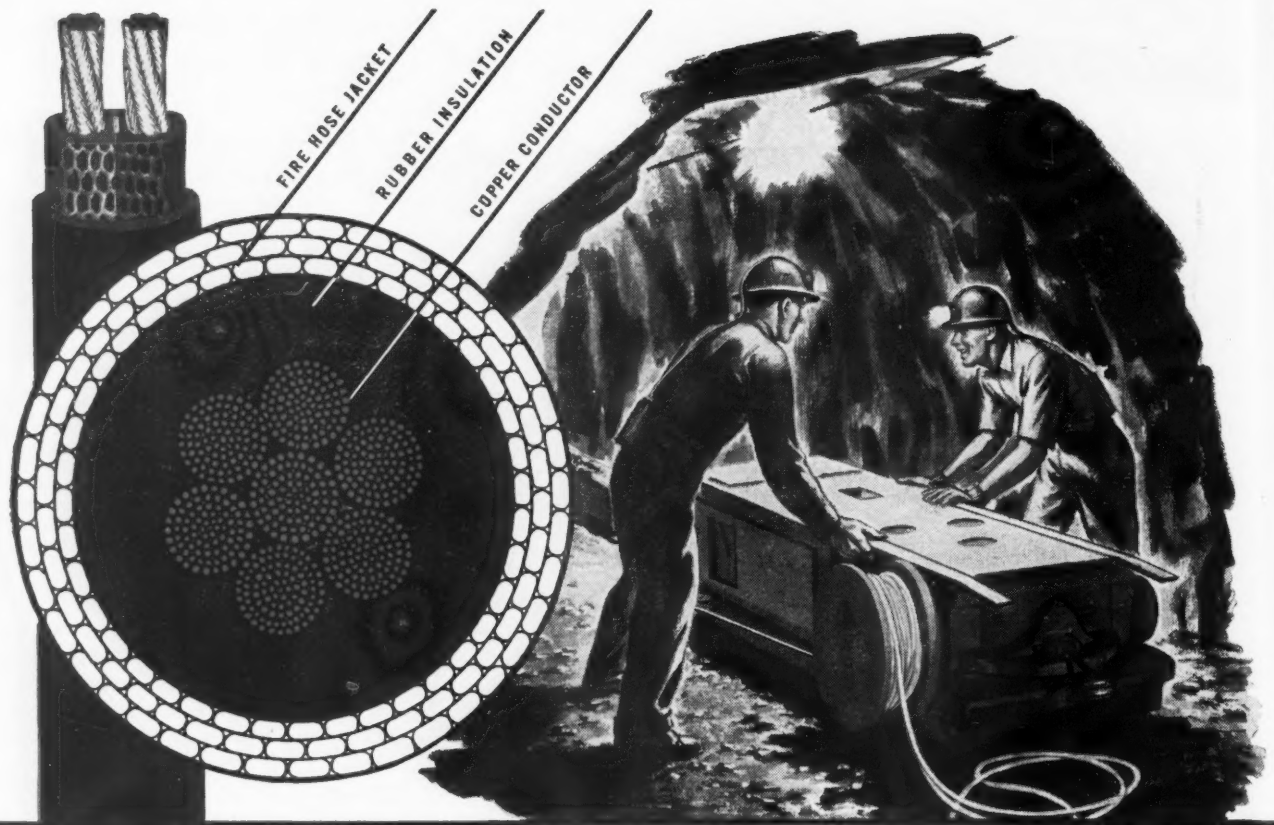
The cause of this strain can be traced to the active material. In the positive plate, lead peroxide (the synthesis of the material when charged) has a smaller volume than the lead sulphate which forms as the battery discharges. From this it can readily be seen that since there is a change in volume, an expanding and contracting action takes place as the battery charges and discharges.

This is the point: Your battery manufacturer allows for this action, basing his design on the capacity of the unit involved. However, discharges beyond the rated point cause a further expansion, and consequently a greater contraction on charge. In an emergency it is permissible to discharge beyond the point of rated capacity, but *only* in an emergency. Continued use of any battery beyond this point amounts to direct abuse and must be avoided.

We would like you to know the Gould men who will take care of your industrial storage battery requirements.

Serving a number of states in the southern Mississippi Valley are W. H. Burkey, Sales and Service Manager, at 1218 Olive Street, St. Louis, Mo., and J. F. Bursh of 1901 So. Fourth Street, Leavenworth, Kansas. Somewhat farther west and south is R. G. Lawrence at 4935 Cass Street, Dallas, Texas.

Gould also has two factories in this same area, one located at Leavenworth, Kansas, and the second at Dallas, Texas.



Duracord saves up to **50%** rubber in portable cables...has a better than 20-year service record

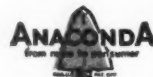
THERE is nothing "ersatz" about Duracord*; it is a cable construction developed during the last war to meet the need for heavy-duty cords and cables... a need it is *currently* filling not only in mines but also industrial plants and shipyards.

The Duracord covering is woven like a fire hose—*not braided*. This tough yet flexible cover

replaces the rubber jacket on all-rubber cords making possible rubber savings as high as 50%.

For further information, please send us your inquiries.

SUNEX SECURITYFLEX* TO WAR
This well-known all-rubber



Two marks of achievement—the cherished Navy "E" (awarded to two of our plants) for achievement in production...The Anaconda trade-mark for achievement in quality.

companion to Duracord has been preempted for the toughest kind of jobs in the war effort where all-rubber cord is mandatory. Until peace, its use will be strictly regulated. 43256

*Reg. U.S. Pat. Off.

ANACONDA WIRE & CABLE COMPANY
Subsidiary of Anaconda Copper Mining Co.
General Offices: 25 Broadway, New York
Chicago Office: 20 North Wacker Drive
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Sunex Securityflex and Duracord

ANACONDA WIRE & CABLE COMPANY

ALL S-D 1-2-3 "AUTOMATICS" Are NOT Alike

**But the same remarkable
1-2-3 Automatic principle
is built in every car.**

★ Every S-D 1-2-3 "Automatic" mine car is built to meet the particular requirements of the mine using it. Heights, widths, lengths, loading and dumping conditions and a dozen other problems are involved. This is why our engineers cooperate thoroughly with you before S-D 1-2-3 "Automatics" are produced. It is this thorough engineering job that makes S-D 1-2-3 "Automatic" installations smooth running from the start.

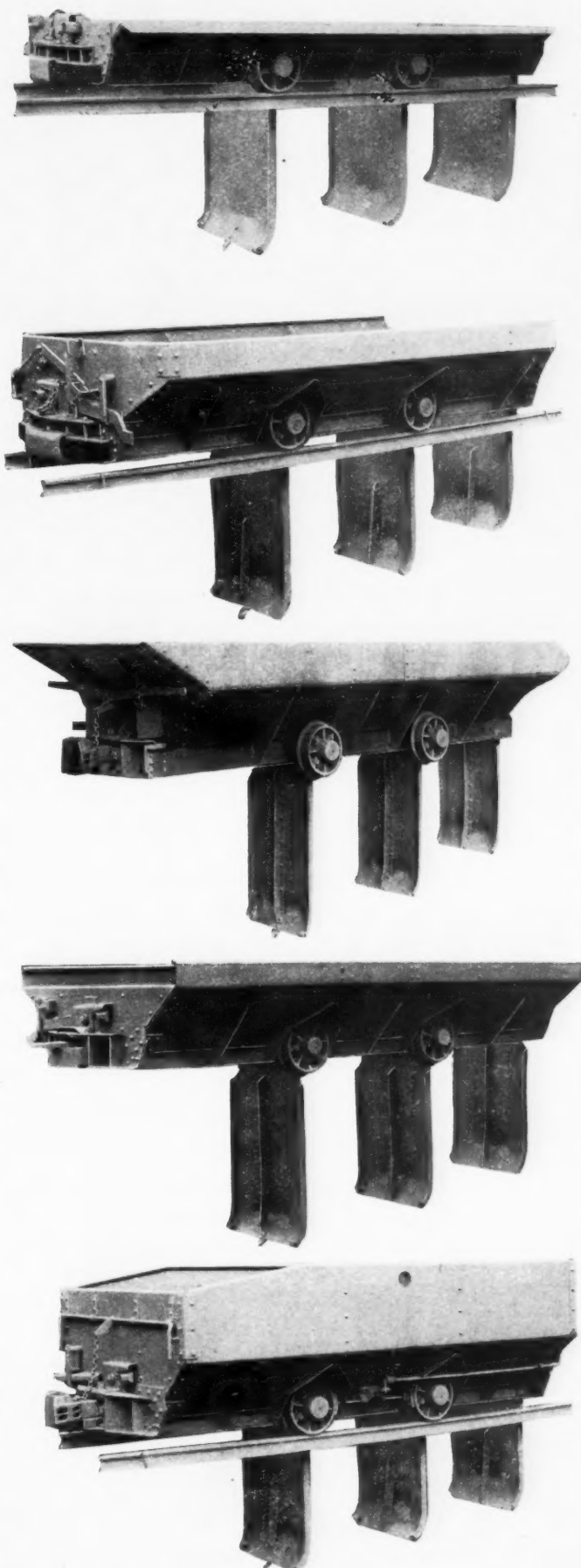
But in all S-D 1-2-3 cars, regardless of size and shape, the "Automatic" action is identical . . . the rewards of which always are the same. Increased tonnage, greater turn-over of cars, fewer cars, faster, safer haulage—lower costs per ton of coal produced (savings so great they often pay for the cars in 12 to 18 months) and conservation of man power (so much needed now).

S-D 1-2-3 "Automatics" are recognized, more than ever before, by leading mining men, as essential equipment for maximum production at the lowest cost per ton. An investigation will convince the most skeptical "Doubting Thomas".

You Can Have S-D 1-2-3 "Automatics" on a RENTAL PLAN

You may have all the advantages of S-D "Automatics" on a rental basis, and your savings will more than pay the rentals. All the time, you will have an option to purchase the cars and terminate the rental contract. This proposition is proof of our claims of what these cars will do for you.

**SANFORD-DAY IRON WORKS
KNOXVILLE TENNESSEE**



The Next Step Beyond Cooperation— SYNERGISM



Cooperation paves the way for synergistic thinking—when minds, cooperating to get better results, “click” from the impact of idea meeting idea and evolve a result that is far greater than the sum total of the ideas expressed.

In the coal mining field, SYNERGISM has licked many a tough problem. Take the case of the “loafing” coal washer that was running at only 50% capacity. Here, indeed, was an opportunity for synergistic thinking.

The problem was full of knotty angles:

1. The tender, shaly roof had to be protected.
2. Coal had to be shot within a 2" to 8" range and fines kept to a minimum for easy handling on the loaders and conveyors.
3. The drill procedure couldn't be changed—that meant adding an extra man to the crew.

Atlas technical men did some stiff synergistic thinking with the customer—and licked the problem. The washer is now running at full capacity, the mine is producing plenty of 2" to 8" coal, fines are kept at a minimum—and every qualification has been met.

At hindsight, the reason why seems simple—using three 1½" Atlas Coalite T cartridges (instead of 2 of a larger size) in the 2½" drill holes, keeping the holes high and flat, and using plenty of stemming.

*Moral? When the blasting problem is tough,
ask Atlas to do some synergistic thinking
with you. We are always ready to help.*

ATLAS

EXPLOSIVES
“Everything for Blasting”



ATLAS POWDER COMPANY, Wilmington, Del. • Offices in principal cities • Cable Address—Atpowco





LOW MAINTENANCE

STEADY PRODUCTION

WITH JEFFREY



ENANCE

DUCTION

JEFFREY RENEWAL PARTS

JEFFREY

EQUIPMENT for MECHANIZED MINING

LOADERS

CONVEYORS

LOCOMOTIVES

DRILLS

CUTTERS

 **RENEWAL PARTS**

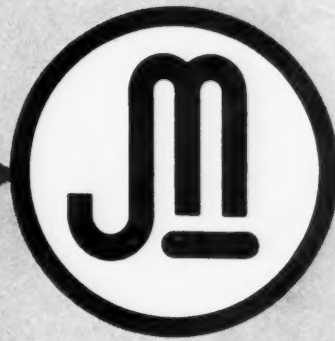
BLOWERS

FANS

JIGS

CRUSHERS

SCREENS



**BELOW AND ABOVE GROUND
FROM FACE TO RAILROAD CAR**

Y
or
NING

MAINTENANCE HINTS

With Jeffrey parts you eliminate the risk of possible misfits . . . frequent replacements . . . costly breakdowns. With each part comes the assurance that it possesses the same high standard of quality as the original . . . that it will fit perfectly and will give the same long, dependable service characteristic of Jeffrey mining equipment as a whole, and vital to profitable operation.

1. GEARS AND PINIONS

The most important point in replacing gears and pinions is to see that they mesh properly. A gear will usually wear out about five pinions—a new gear installed with a badly worn pinion will usually ruin the gear—they will not mesh properly.

2. WORMS AND WORM WHEELS

These items must also mesh properly when installing — be well lubricated when in operation.

3. SPROCKETS AND CHAINS

When installing a new sprocket — check the pitch of the chain. Do not use a new sprocket with worn chain or a worn sprocket with new chain.

4. ARMATURE COILS

When rewinding an armature — be sure the core is smooth with no burnt places — no sharp frayed edges which might penetrate the coil. Always use a connection diagram.

5. CUTTER CHAINS AND BITS

After every cut — run the machine to throw off dust; lubricate with No. 52 oil while the chain is still hot. Keep bits sharp — replace lost or worn ones. For smooth running — replace any broken lug with one of the same angle.

6. CONTINUOUS STEEL STRIP RESISTORS

Keep the resistor bolted firmly in place — leads clamped tightly in the terminals. The resistor element is insulated from the plate with vitrous china blocks — the plates are insulated from the frame with micanite. Be sure this insulation is always in good condition.

7. LININGS AND BUSHINGS

Keep well lubricated with proper lubricant. Watch excessive wear — worn linings and bushings throw gears and other parts out of mesh or alignment.

8. COMMUTATOR REFILLS

When a commutator is worn down — replace at once. Refills are furnished baked and finished — banded to mount on shell.

Follow Factory Lubrication Recommendations.

THE JEFFREY MANUFACTURING COMPANY

912-99 North Fourth Street, Columbus, Ohio

Sales Offices:

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W. Va.

Scranton

ROUND
D CAR

Picking and Choosing.

With workmen getting scarcer all the time, finding good men for battery maintenance is getting ever more difficult. All batteries, of course, deserve good maintenance—but it is easier to train new men in the proper maintenance of alkaline batteries, and there is much less risk and trouble while they're learning. Charging in the wrong direction or failing to terminate the charge at the exact moment are common examples of the electrical "accidents" that cause no permanent injury in alkaline batteries.



For the Duration. Hand-to-mouth buying of equipment has gone by the boards, because this looks as though it will be a l-o-n-g war. Consequently, equipment which will last for the duration and be economical after the war is over is much the most desirable. Edison Alkaline Batteries have shown that they last two to five times longer than other batteries . . . so naturally, they are that much more likely to see the critical period through.

Faster Charging Rate.

More mechanization is speeding up the production, but it is also putting new drains on the power lines. The faster charging rates which can be accepted by Edison Alkaline Batteries present two distinct advantages: (1) the batteries can be hustled back to the job more quickly, *fully charged*; and (2) if the off-peak charging time has, through increased shifts, been cut down, alkaline batteries can accommodate themselves better to the new conditions.

Edison Storage Battery Division
Thomas A. Edison, Inc.
WEST ORANGE, N. J.

THIS POWER is predictable

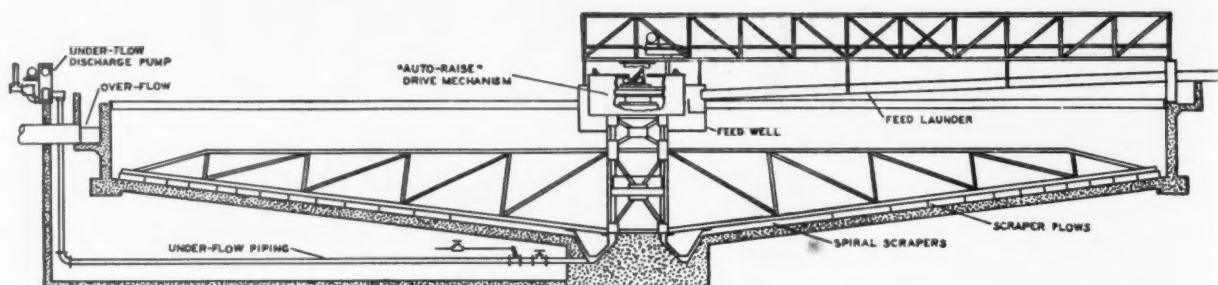


Underground haulage can be the most costly item in the whole war production scheme—because the cost is determined not alone in dollars, not alone in time—but in production itself. When the filled cars come through, we are winning the war. When they stop, we are losing it! All of which is another way of saying that the power units which you use underground must

be predictable if the production flow is to be kept even. There is no way of making up lost time, but there is a way of forestalling lost time—and that is the use of Edison Alkaline Batteries. It is a fact recognized throughout mining, industry and railroading that there is no battery which gives such uninterrupted operation—and a performance that is so fully predictable. Yes

MINING NEEDS THE RELIABILITY OF

Edison Alkaline BATTERIES



HARDINGE CENTER PIER "AUTO-RAISE" THICKENER

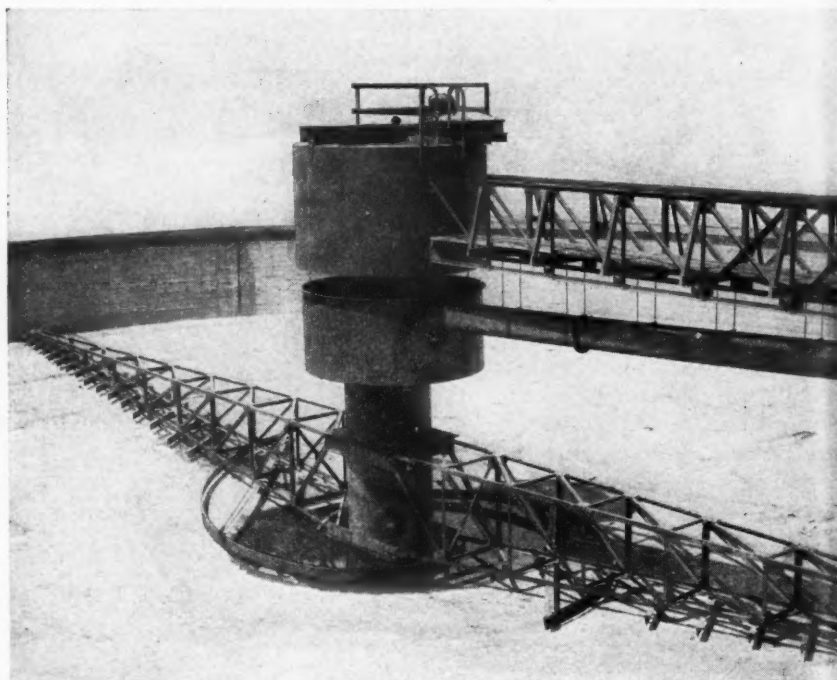
Illustrated here is the latest in large Thickener developments. It is the "Auto-Raise" center pier Thickener.

An overload anywhere in the tank bottom, regardless of whether at the rim or near the center, will actuate the raising mechanism. The entire scraping mechanism raises as a unit, thus eliminating stresses which cannot be controlled if only part of the scraping mechanism is relieved.

Write for our Thickener Bulletin 31-C

HARDINGE EQUIPMENT

	Bulletin No.
Agitators	31-C
Clarifiers	31-C
Classifiers, Air	17-B
Classifiers, Counter-Current	39-A
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Filters, Sand	30-A
Metal, Reclamation	8-A
Mills, Batch	19-A
Mills, Conical Ball	13-D
Mills, Conical Pebble	13-D
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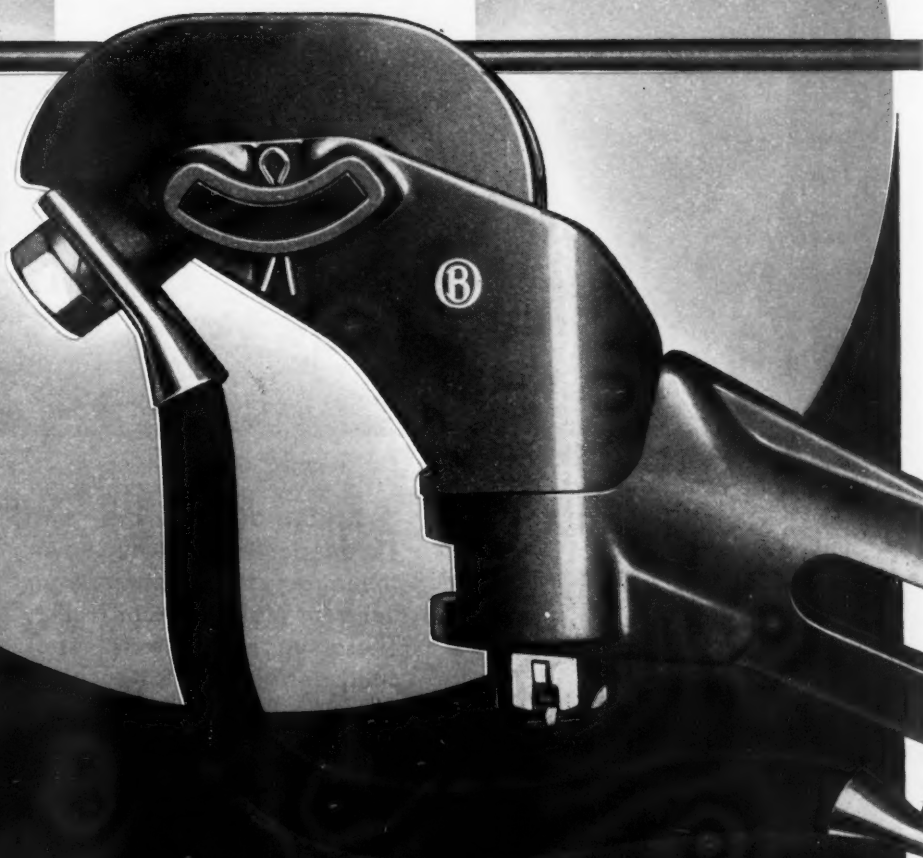


HARDINGE

COMPANY, INCORPORATED - YORK, PENNSYLVANIA

New York, 122 East 42nd Street Chicago, 205 West Wacker Drive San Francisco, 501 Howard Street Toronto, 200 Bay Street

It's the full
3 INCHES
of **"DEAD-CENTER" CONTACT**
that does the trick



O-B TYPE L TROLLEY SHOES

**Prevent Harmful Arcing...Eliminate Burning
"Point" Contacts...Decrease Dewirements**

Ohio Brass

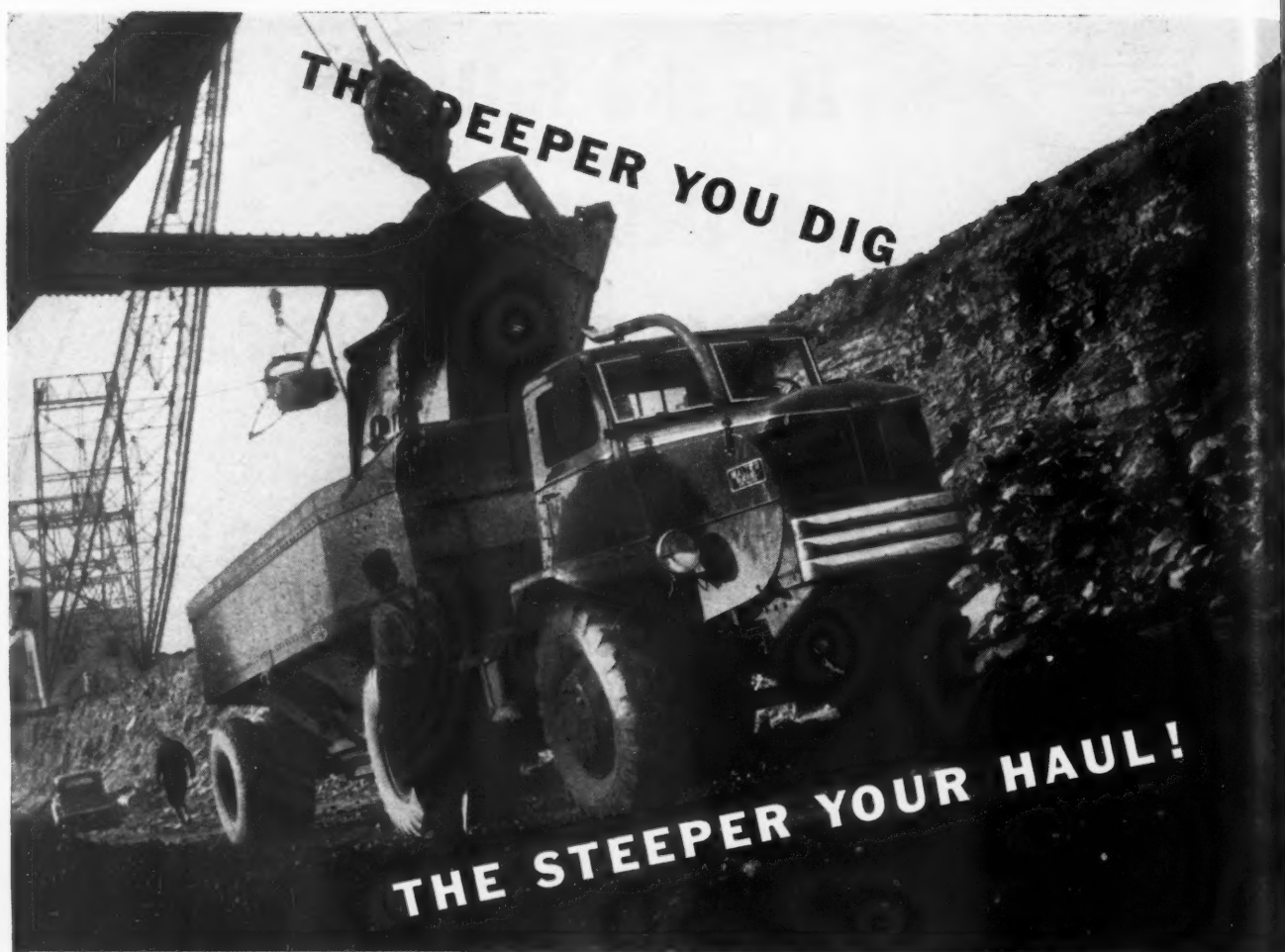
MANSFIELD, OHIO

CANADIAN OHIO BRASS CO., LTD.,
NIAGARA FALLS, ONT.

BUY
WAR
BONDS

SEND FOR BOOKLET 766M

2378-M



**Another
Reason Why
You Need**

**Walter
Tractor
Trucks**

AS you dig deeper and deeper to meet huge war tonnages, the greater your need for Walter Tractor Trucks. These rugged, powerful, specially designed units haul huge loads up the steepest grades, over any road conditions, in any weather—at speeds that give you more trips per day.

Only Walter Tractor Trucks have the unique combination of power and traction that comes from the exclusive 4-Point Positive Drive. This tractive power is provided by 3 patented automatic lock differentials that proportion the power to each of the FOUR driving wheels according to its traction at any instant, preventing wheel slippage.

Other features are: Suspended double reduction

drive, permitting less unsprung weight, higher ground clearance, less tire wear; tractor type transmission, 14-1 ratio, with 6 speeds forward, 2 reverse, single gear lever; short wheelbase and scientifically distributed weight for easy maneuvering; power brakes for safety.

Write today for detailed literature.

**REMOVE
OVERBURDEN
FASTER**

With old mines expanding, new mines opening—removing overburden is a bigger problem this year. The great power and traction of Walter Tractor Trucks makes them best for hauling huge loads through soft dirt, mud or rough terrain.

WALTER MOTOR TRUCK COMPANY

1001-19 IRVING AVENUE, RIDGEWOOD, QUEENS, L. I., N. Y.

3 "Musts"

FOR GOOD TROLLEY CLAMP DESIGN-

Get
Proper Balance
of all Three
with O-B
Bulldog Trolley
Clamp

1. Collector Clearance--

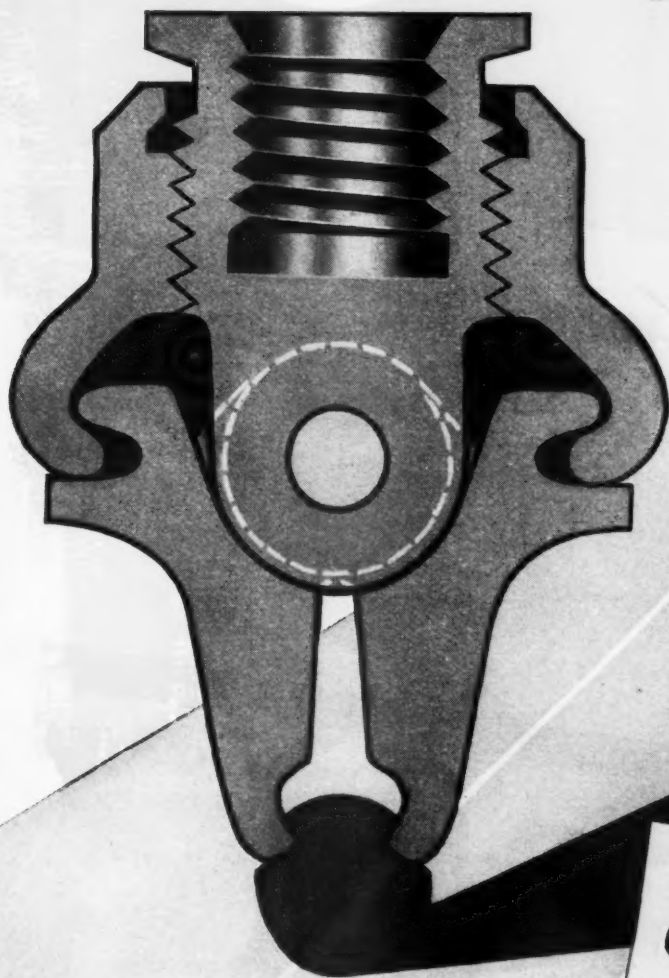
Allow Free Passage of Collector
Without Arcing or Burning Wire

2. Reclaimability--

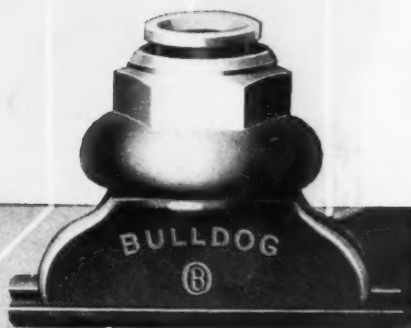
Can Be Used Over and Over Again

3. Holding Power--

Easily Regulated to Suit
Individual Requirements



Cross-Section of an O-B Bulldog. The head-nut automatically controls the opening and closing of clamp jaws.



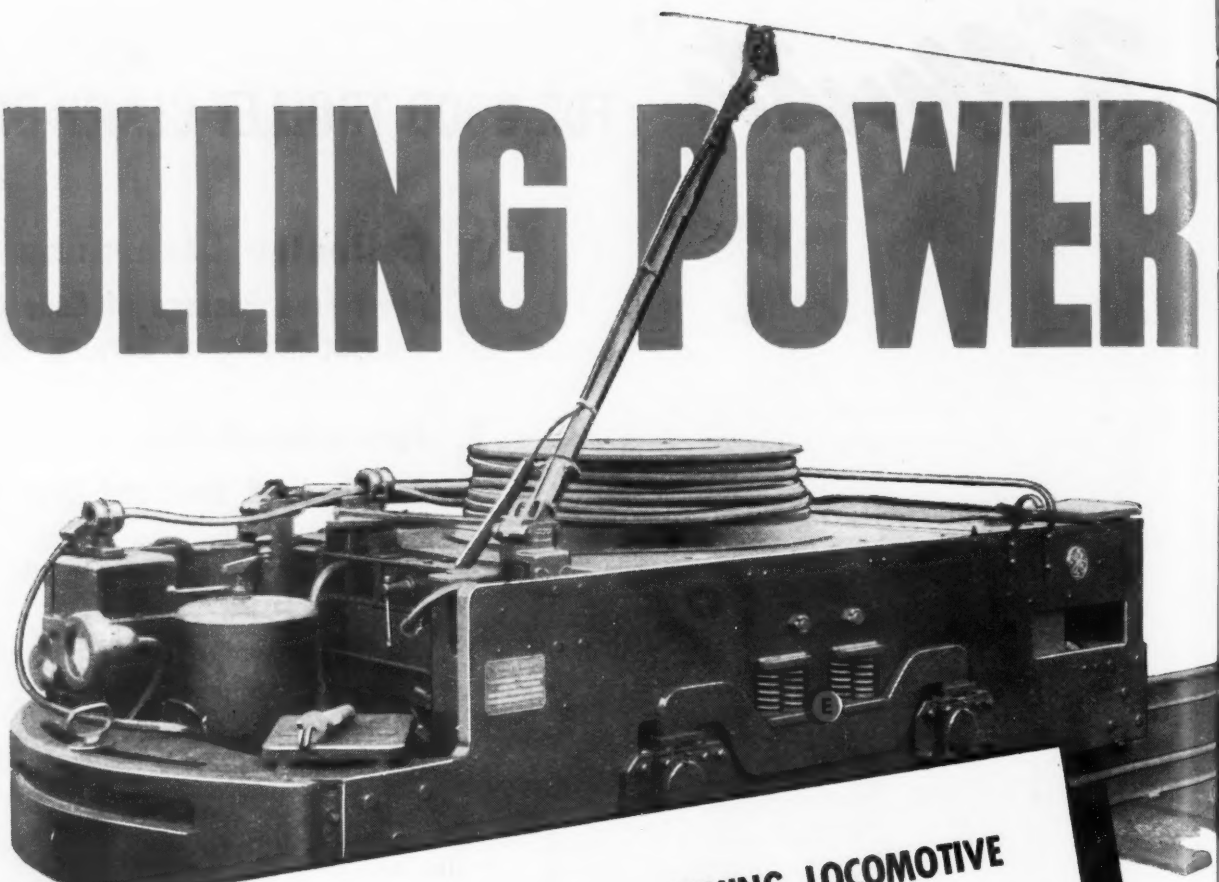
Ohio Brass

MANSFIELD, OHIO
CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.

No One Feature Highlighted At Expense of Other Two

2420-M

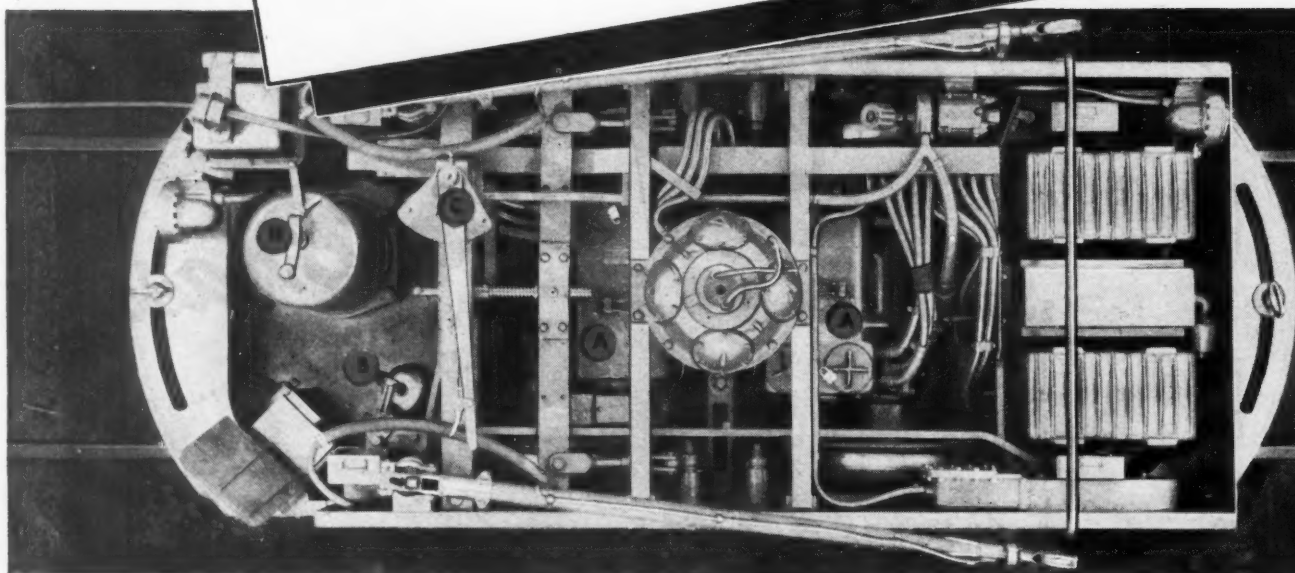
PULLING POWER



G-E 8-TON "SEALED-EQUIPPED" MINING LOCOMOTIVE

- A.** Motors centrally hung for good balance
- B.** Ample space for operator
- C.** Quick-acting lever brake, easily adjusted

- D.** One-hand reversing and plugging controller—readily accessible for inspection
- E.** Side-equalized coil-spring suspension—good balance—stays on the track



To Speed up

NEW BITUMINOUS TONNAGE

Facing the necessity of opening new bituminous mines quickly and safely with limited man power, you'll find General Electric's popular 8-ton "sealed-equipped" gathering locomotive offers definite advantages in:

Continuous "On Track" Performance

Security in Gassy Areas

Low Servicing and Maintenance Costs

This locomotive is of explosion-proof construction. Its centrally hung motors and side-equalized coil-spring suspension produce fine balance, eliminate teetering, track pounding, derailments.

The unit's quick-acting lever-brake and single-hand controller mean faster, more accurate spotting of cars and locomotive, give added assurance of a continuous supply of empty cars at the mine face.

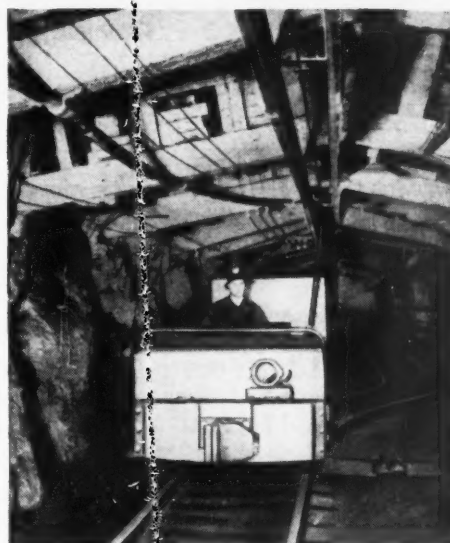
The long service life built into bearings, motors, controller, and cable-reel equipment results in lower maintenance cost and less time out for servicing.

Performance? Repeat orders from three large operators for 97 sealed-equipped locomotives tell the story. So does the preference of the entire industry, which is installing almost as many locomotives of this type as all others combined. *General Electric Co., Schenectady, N. Y.*

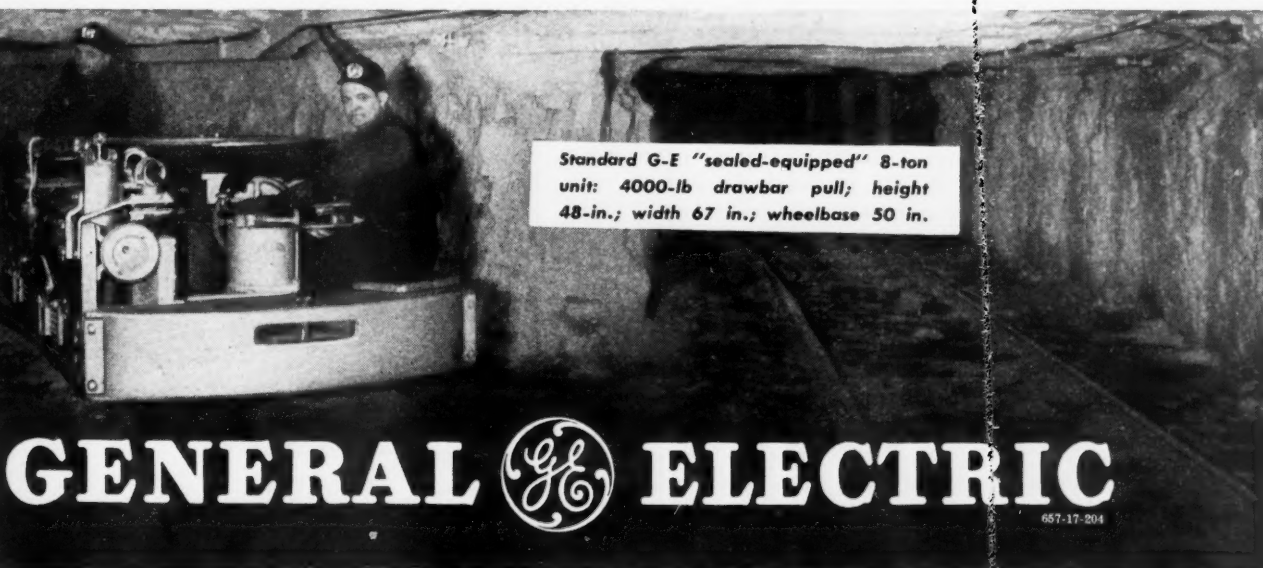
WHATEVER YOUR CONDITIONS
THERE'S A G-E LOCOMOTIVE TO MEET THEM



G-E 8-ton unit with electric cable reel



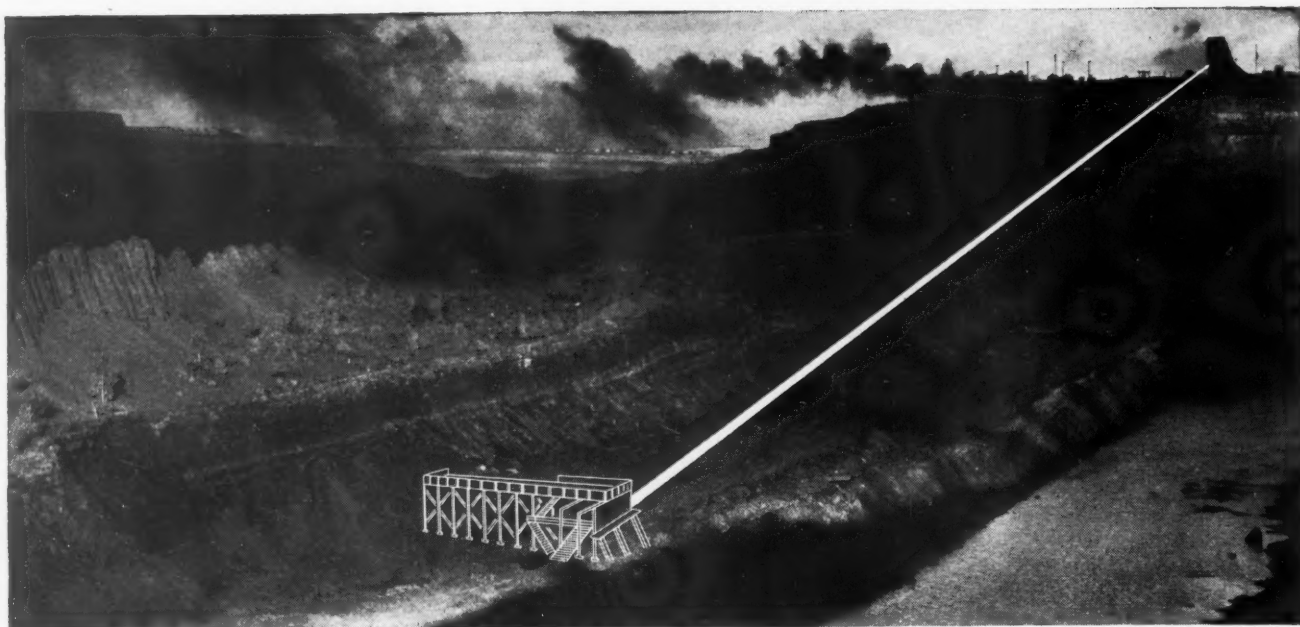
G-E 8-ton mine-type trolley locomotive



Standard G-E "sealed-equipped" 8-ton unit: 4000-lb drawbar pull; height 48-in.; width 67 in.; wheelbase 50 in.

GENERAL ELECTRIC

657-17-204



THE WEDDING OF STEEL AND RUBBER

— the most revolutionary improvement in conveyor belting since the beginning of modern industry — another Goodyear "first"

A GAIN Goodyear steps ahead with a major advance in conveyor belting — a development that makes it possible to operate over far longer distances without transfer.

In this new Goodyear belt the carcass is composed of sinewy, multi-strand steel cables instead of conventional cotton fabric or cotton cord construction. Cables are embedded in rubber by a special Goodyear process that affords higher structural cohesion and longer flex-life than the best cotton-rubber belts.

The advantages of this construction are many, and important:

Huge tension capacity — without exceeding customary belt thickness of $\frac{5}{8}$ " or $\frac{3}{4}$ ", the steel cable belt has the equivalent tensile of 60 to 65 plies of heavy duck!

It is trougahable in all widths — with sufficient "beam action" to support load between rollers without sag or distortion.

Unbroken hypotenuse flow — no transfers — from mine levels to surface in longest slope operations, an

important advantage with sticky ores.

On cross-country horizontal hauls, single belt flights operating on centers up to eight miles apart are possible. This reduces the number of motors, take-ups, controls and supervisors heretofore necessary on long belt hauls — *savings that alone will pay the cost of the belt in large tonnage operations!*

All these features further enhance the position of Goodyear conveyor belt systems as the world's lowest-cost-per-ton carrier — plus the advantage of *continuous high-capacity haulage*, and the ability to operate "crow flight" over rough terrain. For the time being, Goodyear steel cable belts are available only on highest priority. For full information consult the G.T.M. — Goodyear Technical Man — or write Goodyear, Akron, Ohio or Los Angeles, California.

GOODYEAR INDUSTRIAL RUBBER GOODS

 **- Specified STEEL CABLE CONVEYOR BELT**
for Oliver Iron Mining Co., Morris Mine, Hibbing, Minn.



GOODYEAR
THE GREATEST NAME IN RUBBER

NEED STEEL?

Call us



GENERAL PURPOSE STEELS

Steel Products, Tools, Machinery and Equipment

A call to us may solve your problem. Many such calls have kept vital war production from being stopped for lack of some piece of steel—or some piece of machinery or equipment. If we have what you want, it can be yours *in a hurry*—subject, of course, to priority restrictions. If we don't have it, we'll do everything we can to help you find a source of supply. Try us—note addresses, phone and teletype numbers at right.

NATIONAL EMERGENCY ALLOY STEELS

These new steels have made it possible to meet the critical conditions imposed by the shortages of strategic alloys. They have given satisfactory results—in fact, have sometimes out-performed steels previously used.

We welcome your inquiries. We'll gladly assist you in determining the grades best suited to your needs. Phone, wire or write our nearest warehouse.

AIRPLANE STEELS

Our Chicago Warehouse has been designated by the War Production Board as a warehouse to distribute the aircraft materials listed below. They are for use in airplanes and available at our Chicago Warehouse only.

WD-X-4130 SHEETS. Open Hearth, Normalized, Pickled and Oiled to Spec. AN-QQ-S-685, Condition N. All gauges .016 to .50, sheets 18 x 72".

NE-8630 SHEETS. Open Hearth, Normalized, Pickled and Oiled to Spec. AN-S-12, Condition N.

STAINLESS STEEL BARS.....Spec. AN-QQ-S-771.
STAINLESS SHEETS.....Spec. AN-QQ-S-772. Spec. AN-QQ-S-757.

WRITE, PHONE OR WIRE, if you are eligible for these Airplane Steels, to United States Steel Supply Company, P.O. Box MM, Chicago, Ill. Telephone BRUnswick 2000 — Teletype CG. 605.

UNITED STATES STEEL SUPPLY COMPANY

(formerly Scully Steel Products Company)

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BALTIMORE,	Bush & Wicomico Sts.,	GILmore 3100 Teletype BA. 183
BOSTON,	176 Lincoln St., Allston, P. O. Box 42	STAdium 9400 Teletype BRTN. 10
CLEVELAND,	1394 E. 39th St.,	HEnderson 5750 Teletype CV. 153
NEWARK, N.J.,	Foot of Bessemer St., P. O. Box 479	Bigelow 3-5920 REctor 2-6560
PITTSBURGH,	1281 Reedsdale St., N.S.,	BErgen 3-1614 CEdar 7780
ST. LOUIS,	21st & Gratiot Sts.,	Teletype PG. 475 MAIn 5235
TWIN CITY,	2545 University Ave. St. Paul, Minn.	Teletype SL. 384 NEstor 2821 Teletype STP. 154



UNITED STATES STEEL

DON'T let mine car



A.C.F. Chilled Tread Mine Car Wheels, as manufactured under our heat-treating process, are made from a special mixture of metals—better for mine car wheels than either steel or iron, alone.

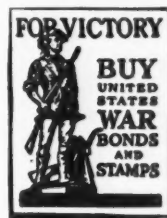
'casualties' cripple essential coal production!

Coal is vital to victory. Every mine car that goes out of service today, throws a heavier burden on the others — hastens the next 'casualty' . . . and the next! *For the coal must be kept coming!*

We can supply needed new wheels, trucks, axles, and electrically welded end sill construction with spring bumpers. Delivery of complete cars depends upon receipt of materials. So place your orders promptly for such items as you absolutely need. In the meantime do everything possible to hold car 'casualties' at a minimum.

Watch your mine cars' operating speeds and loads — for when loads and/or speeds get above a certain point all plain and self-oiling wheels will wear out in the hub. If you must have more speed, make sure you have the equipment to do the job. Give your operating men a chance to produce the needed extra coal.

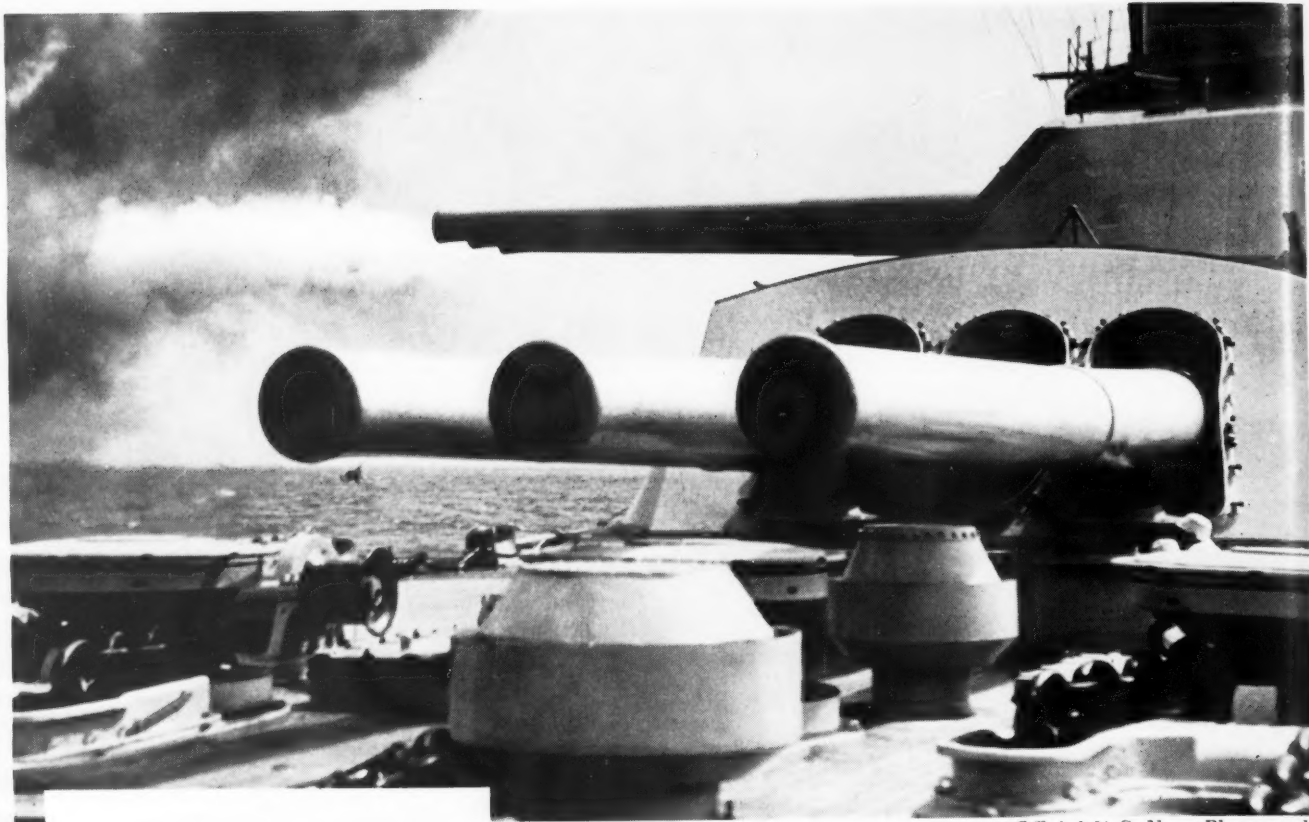
Our entire manufacturing and service facilities are at your disposal to aid you in keeping your vital mine cars rolling out the coal faster and faster — rolling out victory, itself!



a.c.f.

AMERICAN CAR AND FOUNDRY COMPANY

NEW YORK • ST. LOUIS • CHICAGO • PHILADELPHIA • BERWICK, PA. • PITTSBURGH • CLEVELAND • HUNTINGTON, W. VA.



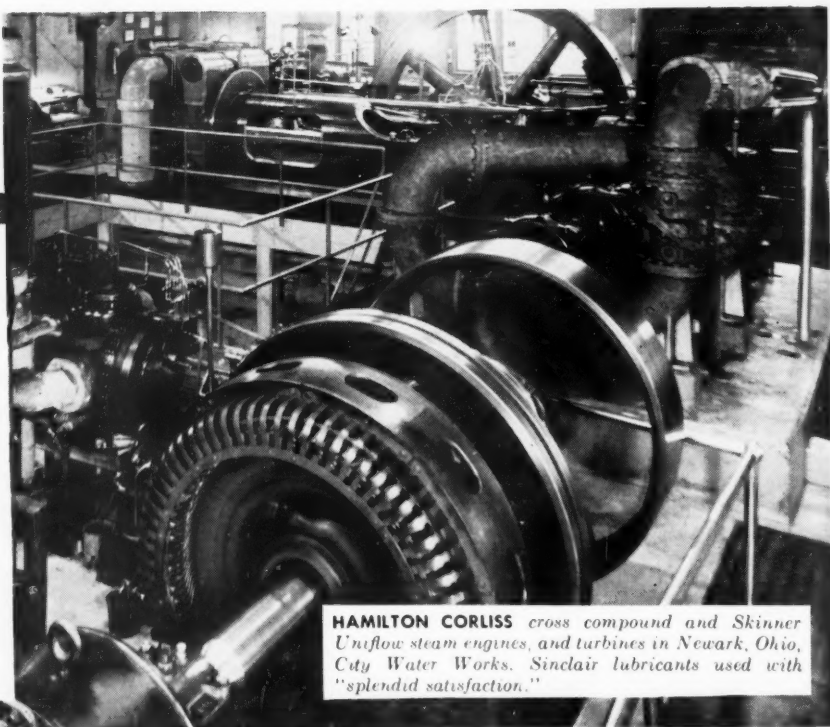
Official U. S. Navy Photograph

BIG PUSH ABROAD

needs all-out support at home To maintain full designed *STEAM* plant output use .

...SINCLAIR STEAM CYLINDER and VALVE OILS. These oils meet wet, dry, or superheated steam requirements, are easily separated for steam recovery . . . suit all engine designs and operating characteristics

Write for "The Service Factor"—a free publication devoted to the solution of lubricating problems



HAMILTON CORLISS cross compound and Skinner Uniflow steam engines, and turbines in Newark, Ohio, City Water Works. Sinclair lubricants used with "splendid satisfaction."

SINCLAIR INDUSTRIAL OILS

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SINCLAIR REFINING COMPANY (Inc.)

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CHICAGO

10 WEST 51ST STREET
NEW YORK CITY

RIALTO BLDG.
KANSAS CITY

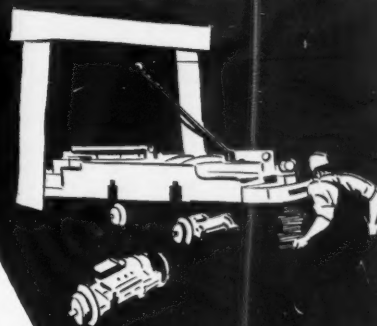
573 WEST PEACHTREE STREET
ATLANTA

FAIR BUILDING
FT. WORTH

*to your and
another*

A.R.B.
Superintendent

Haulage locomotive on main line in No. 6 broke
down on outby switch. Haulage way blocked for
two hours—Cost 500 tons of coal plus repairs
and new parts.
Cause: journal bearing failure due to in-
adequate adjustment and lubrication. Neces-
sary to bring spare truck to get locomotive o-



Send for copies of this book now. Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. J-15081

SEND TODAY for as many copies of this book as you need for your men. Write Dept. 7-N, ask for booklet B-3150.



Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

MINE LOCOMOTIVES



CARBON

TIDE WATER LUBRICANIA

DEFINITION: The Carbon Residue Test is a means of determining the amount of Carbon which remains after an oil has been evaporated under certain conditions of high temperature and under exclusion of air.

TEST (Conradson Carbon Residue): Following a carefully prescribed procedure with standardized equipment, a sample of the oil is heated and the oil vapors allowed to burn. After the vapors cease to come off the heat is raised for a given period to cause the destructive distillation of the remaining liquid. The Carbon Residue is the weight of the carbonaceous residue left in the crucible, expressed in percentage of the original weight of the oil.

EXAMPLES: (% Carbon Residue)

Nil	Gasoline
Nil	Kerosene
Trace - 0.05	No. 2 Fuel Oil
0.03-0.25	Machine Oils
0.3-1.5	SAE 50 Motor Oil
1.5-4.5	Steam Cyl. Oils



SIGNIFICANCE: The Carbon Residue Test may be important with fuel oils or gas oils used in certain oil burning or gas manufacturing equipment. As an index to carbon forming tendencies of lubricating oils for use in internal combustion engines, it is totally unreliable. The quantity and nature of such engine deposits are greatly influenced by the oxidation susceptibilities of the oil and other factors peculiar to engine operation. Oils high in resistance to oxidation and otherwise most desirable for heavy duty operation often give relatively high Carbon Residue values.

OIL IS AMMUNITION

USE IT WISELY !

DRUMS! DRUMS! DRUMS!
War needs make it extremely important that all empty drums be returned immediately.

To assure the unvarying high quality of Tycol Products they are rigidly controlled and subjected to all essential tests during manufacture. Tycol lubricants for internal combustion engines are available in different types and grades to meet different conditions of operation. Call upon the Tide Water industrial engineers who will recommend the Tycol product best suited to your problem.

TIDE WATER ASSOCIATED OIL COMPANY

Eastern Division: 17 Battery Place, New York
Principal Branch Offices: Boston, Philadelphia, Pittsburgh, Charlotte, N. C.
MAKERS OF THE FAMOUS VEEDOL MOTOR OIL

SCIENTIFICALLY ENGINEERED
FOR EVERY INDUSTRIAL USE

TYCOL



RESIDUE

* This is #4 of a series of informative messages concerning the meaning and significance of commonly used tests and terms employed to describe the characteristics of lubricating oils.



INDUSTRIAL LUBRICANTS



THE MINE CAR OF TOMORROW *has already been built*

COAL company haulage experts and mine car builders who have worked on the problem agree that the ideal mine car must fill three basic requirements:—

- it must have maximum hauling capacity
- it must have minimum deadweight per cu. ft. capacity
- it must be strong and rugged to stay on the job.

With the advent of COR-TEN almost nine years ago the ideal material for such construction became available.

As car builders discovered the possibilities of this superior low-alloy, low-cost, high tensile steel, mine car design and construction were progressively improved with a resultant step-up in efficiency that was immediately reflected in greater output, lower operating costs and decreased expense for maintenance.

More than 10,000 COR-TEN mine cars are already in use. Some of them, built just be-

fore COR-TEN was limited to direct application in war equipment, are admittedly years ahead of their time.

Today, in mines operating at maximum capacity, this high-efficiency COR-TEN equipment is already demonstrating what tomorrow's mine cars will have to offer.

COR-TEN can be used to improve the efficiency of any type of car. For COR-TEN is a versatile steel, that is readily fabricated by all the usual shop methods and, in addition, lends itself well to whatever variations in design and dimensions are necessary to meet local operating conditions and users' preference.

Remember these facts when you plan for tomorrow. Even though COR-TEN is today not available for mine car construction, it will be back when the fighting is over—to help make your equipment lighter, stronger, long-lasting and more economical to operate.

U·S·S Cor-Ten is strong. It has a yield point more than 50% higher than structural quality open hearth steel. It is tough and hard-wearing. Highly resistant to shock and vibration, it has 1/3 greater resistance to abrasion than mild steel. And important in coal mine equipment, COR-TEN has unusually high resistance to atmospheric corrosion—4 to 6 times that of plain steel, 2 to 3 times that of copper steel.

But you pay no premium for using this superior steel, for COR-TEN in thousands of mine cars has proved that it will safely reduce weight with little or no increase in cost. It's not too early to find out what COR-TEN has to offer.

AMERICAN STEEL & WIRE COMPANY, Cleveland, Chicago and New York
CARNEGIE-ILLINOIS STEEL CORPORATION, Pittsburgh and Chicago
COLUMBIA STEEL COMPANY, San Francisco
NATIONAL TUBE COMPANY, Pittsburgh
TENNESSEE COAL, IRON & RAILROAD COMPANY, Birmingham

United States Steel Supply Company, Chicago, Warehouse Distributors • United States Steel Export Company, New York



UNITED STATES STEEL

Large LOADING CAPACITY

DIGS IN
HIGH

as well as
LOW SEAMS
OF COAL

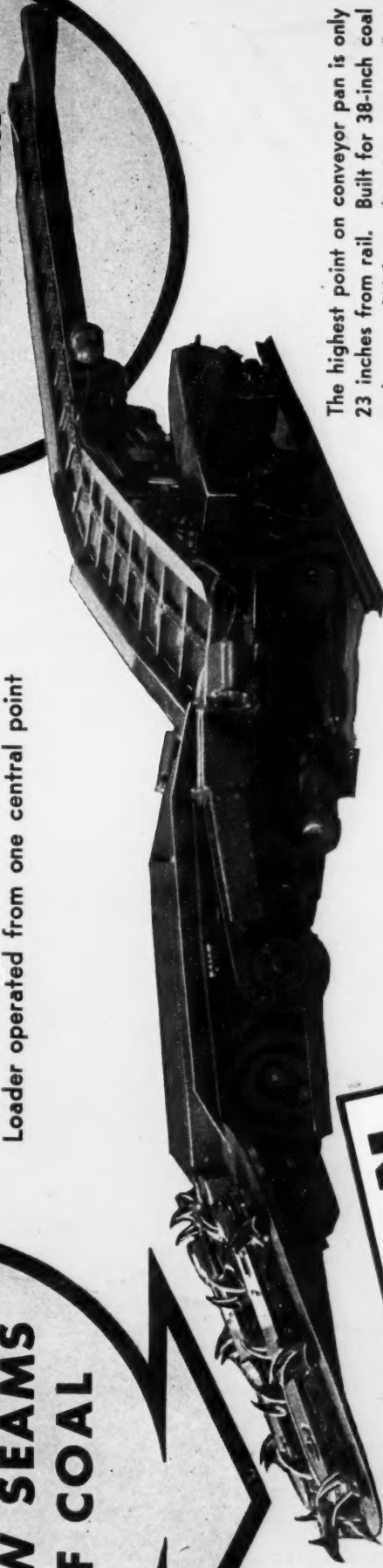
★ Maximum,—loads 4½ ton cars in 30 seconds
Digs out tight corner shots perfectly

Clarkson Universal Flexible Conveyor is known for
its ability to load the highest tonnage on a car.

The tail end of conveyor designed so as to keep
entirely free from trolley wires when traveling on
road.

Loader operated from one central point

Adjustability
FOR
LOADING
HIGH OR LOW
MINE CARS



The highest point on conveyor pan is only
23 inches from rail. Built for 38-inch coal
and over. Wide application range. Fast
loading and tramping speed.

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LOWEST LOADING MACHINE ON WHEELS

CLARKSON
Universal
LOADER 24 BB
TRACK MOUNTED

The **CLARKSON**
MANUFACTURING COMPANY
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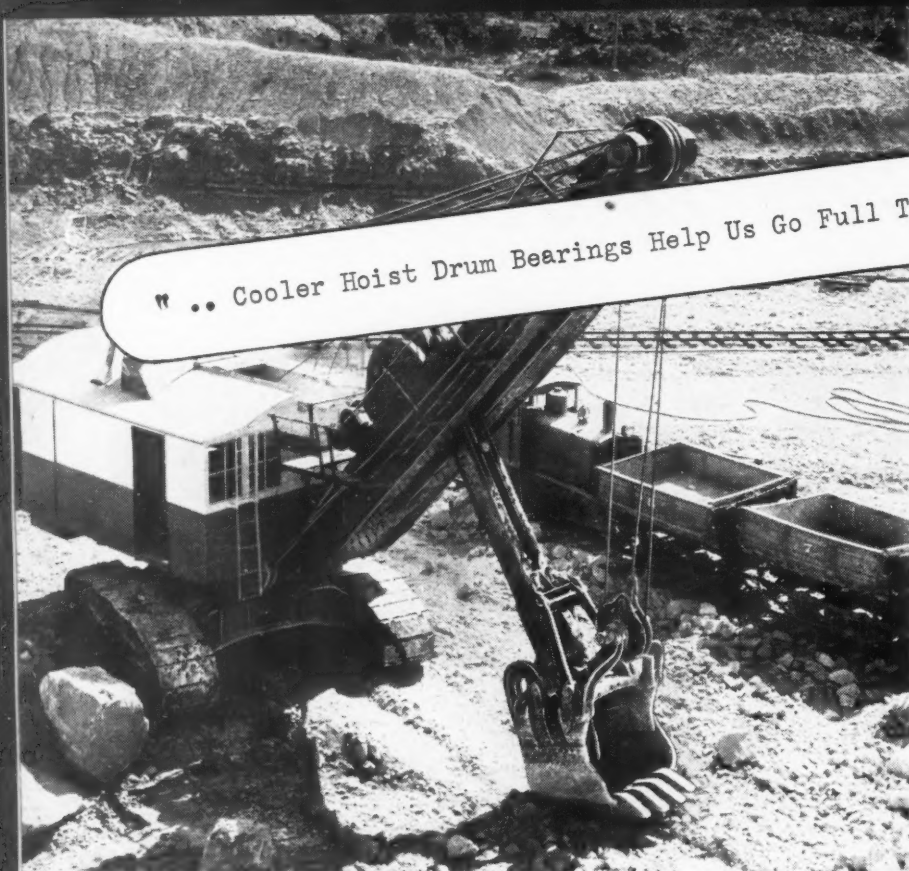
512 Shortwall

A rugged, compact machine short enough to operate effectively in close posting, low enough to perform conveniently in most seams . . . an ideal machine for use with the Goodman shaker conveyor system of mining.

Call in a Goodman sales engineer for details.



HALSTED STREET AT 48TH • CHICAGO, ILLINOIS



"... Cooler Hoist Drum Bearings Help Us Go Full Tilt All The Time "

Strip Shovel operator in Illinois tells how better lubrication boosted daily tonnage

● IF THE COAL INDUSTRY is to hit its 620,000,000-ton goal for 1943, there must be fewer slow-ups to "baby" shovel bearings that can't stand the gaff of heavy, continuous going. And many operators are turning to better lubricating methods to step up shovel and dragline outputs.

Take the case of the dragline working recently in an Illinois pit. When the going was average, the main bearings on the hoist drum ran only moderately warm. But when it became necessary to step up the pace for several hours, the bearings got dangerously hot.

In looking over this job with the dragline operator, a Standard Lubrication Engineer found nothing wrong with the drum bearings. But he recommended a

grade of Superla Grease that had proved its ability to shoulder heavy, steady loads. Last report was: "Cooler hoist drum bearings help us go full tilt all the time."

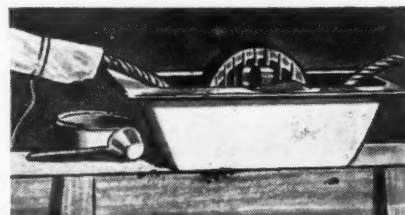
Keep wire rope well lubricated to keep the coal coming out. As you know, the strands of wire rope rub against each other whenever the rope passes over a sheave or winds on a drum.

In fact, the friction between strands of the cable is much greater than between the cable and the sheaves. Unless proper lubrication is provided you can look for excessive friction, binding, and rusting, which may cause premature failure of the rope.

The lubricant should readily penetrate

among the strands of the cable and have strong adhesive quality. Penetration can be aided with most grades of lubricants by passing the cable through a bath under a sheave, as illustrated.

Splendid results are secured by using Calumet Viscous Lubricant for this service. This high quality grease contains an addition agent that makes it extra adhesive and stringy. It has high resistance to heat and pressure and stays with the rope a long, long time. And, unlike certain other greases, it can be applied without first removing the previous lubricant.



Let a Standard Lubrication Engineer help you select—and test—the lubricant you need for steady, low cost working of shovels and draglines, loaders, engines and other mine equipment. A practical study of your lubrication problems by experienced engineers puts you to no expense and may point the way to substantial savings. Write or phone the nearest Standard Oil Company (Indiana) office, or 910 S. Michigan Avenue, Chicago, Illinois, for the Engineer nearest you. In Nebraska, address any Standard Oil Company of Nebraska office.

Oil is ammunition . . . Use it wisely

STANDARD OIL COMPANY (INDIANA)

**STANDARD
SERVICE**

★ LUBRICATION ENGINEERING

Correct Lubrication...

is your wire rope's
BEST FRIEND!

If wire ropes are to give their best service—yes, even longer-wearing **HAZARD LAY-SET PREFORMED**—they must be lubricated regularly—and correctly. Not only will proper lubrication protect the many wires from corrosion and excessive wear, but will permit the internal wires which move one against another when the rope passes over a sheave or winds on a drum, to slide more freely and with less friction. For some short-lived services, factory lubrication is sufficient. For others, additional lubricant must be added in the field, and unless this is done with sufficient frequency, your wire rope is doomed to fail before its proper time. And this is no time to waste steel.

HAZARD LAY-SET PREFORMED WIRE ROPE ordinarily gives so much better, easier-handling, longer service than ordinary non-preformed rope that occasionally operators take its exceptional qualities for granted and forget the oil can. Don't do it. Lubricate your **LAY-SET** correctly, and you will get even *longer* service—even *greater* dollar value. All Hazard ropes identified by the Green Strand are made of Improved Plow Steel.

HAZARD WIRE ROPE DIVISION Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Fort Worth, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Tacoma
AMERICAN CHAIN & CABLE COMPANY, INC. Bridgeport • Connecticut

● IMPORTANT SUGGESTIONS

Clean wire rope thoroughly before lubricating. Use kerosene and wire brush.

Passing the rope through high-pressure jetted steam has proved a very effective means of cleaning, especially larger diameters.

Wipe off excess lubricant.

Frequent lubrication with light-bodied lubri-

cant is better than infrequent treatment with heavier lubricants.

Lubrication of any wire rope is sufficiently important to warrant calling in one of the industrial lubrication men employed by oil companies or a Hazard man. These men can tell you which lubricant will handle your problems best.

HAZARD LAY-SET *Preformed* **WIRE ROPE**

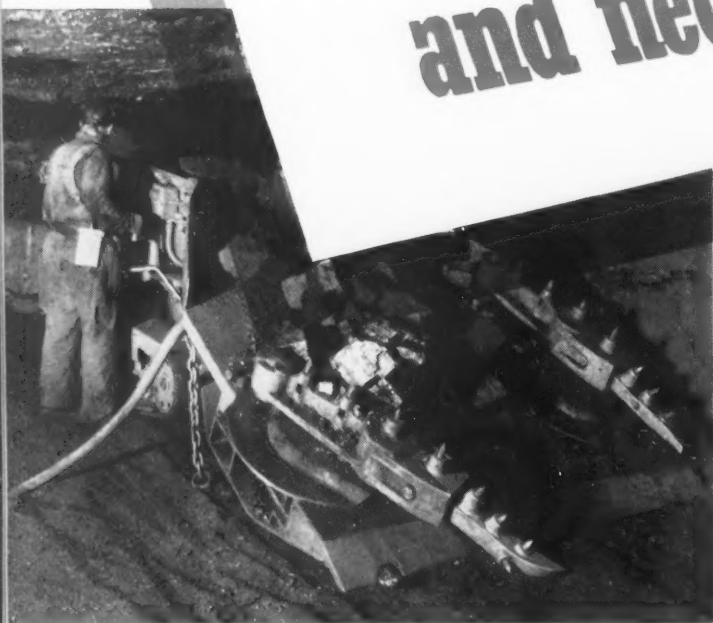
In War, as



Modern equipment is vital and necessary

FREDERIC LEWIS
PHOTO

FREDERIC LEWIS PHOTO



Joy Loaders load coal fast—they are rugged, sturdy units—built to stand hard usage with an amazingly low maintenance cost.



Joy Shuttle Cars have proved their worth in intensive hard daily usage—easy to handle—low in upkeep—fast and entirely mobile—they are cutting costs in many mines under many conditions.

The mysterious Radar, the Walky-Talkies—the great modern Aircraft Carriers—the fine American-built Bombers—products of modern science and American ingenuity are helping this Nation to Victory.

Modern Equipment is just as vital to industry—in peace as well as war—for labor-saving, output-boosting mechanical equipment is necessary to meet today's and tomorrow's competitive demands.

in Peace



HAROLD M. LAMBERT PHOTO



HAROLD M. LAMBERT PHOTO

*Joy Mechanized Units prove their worth
on peak load production*



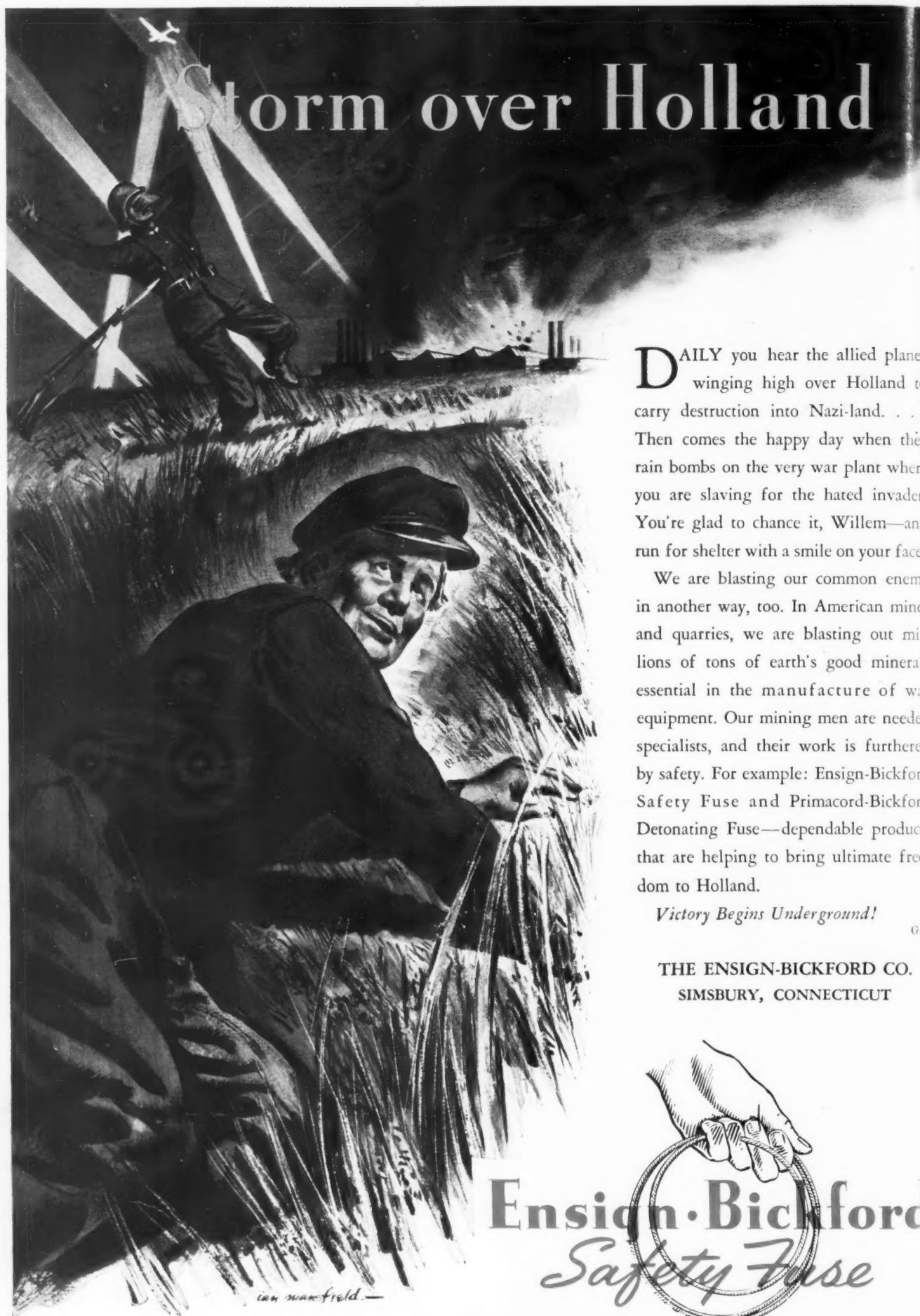
mechanized production advantages of Joy Loaders
Joy Shuttle Cars working together, have enabled
many mines to achieve new peaks in production.

*Call in a
Joy Engineer*



Mechanization has
speeded the Nation's
output of coal.

JOY
MANUFACTURING COMPANY
FRANKLIN, PA.



Storm over Holland

DAILY you hear the allied planes winging high over Holland to carry destruction into Nazi-land. . . . Then comes the happy day when they rain bombs on the very war plant where you are slaving for the hated invader. You're glad to chance it, Willem—and run for shelter with a smile on your face!

We are blasting our common enemy in another way, too. In American mines and quarries, we are blasting out millions of tons of earth's good minerals essential in the manufacture of war equipment. Our mining men are needed specialists, and their work is furthered by safety. For example: Ensign-Bickford Safety Fuse and Primacord-Bickford Detonating Fuse—dependable products that are helping to bring ultimate freedom to Holland.

Victory Begins Underground!

G-5

THE ENSIGN-BICKFORD CO.
SIMSBURY, CONNECTICUT



Ensign-Bickford
Safety Fuse

COAL AGE

JULY
1943

WHAT SEIZURE MEANS

COAL MINING entered on the most critical period in its history when the government seized its properties on May 1.

Government operation may continue indefinitely. Or it may end immediately.

But even if it ceases tomorrow, the mere fact of seizure stands forth as an event of vital, profound and enduring significance—to the coal industry, to all other industries, and to the American people.

Just what is the meaning of this event? What deep underlying lessons does it contain for the industry and for the nation? What guideposts, what landmarks, are there to help both industry and government avoid some of the pitfalls on the road ahead?

In the following pages, *Coal Age* analyzes the implications—past, present, and future—inherent in the mine seizure. This analysis is presented under four headings:

1. How Politics Set the Stage.
2. What the Public Learned.
3. What's Ahead in Washington.
4. Coal's Big Job: Goodwill.

The end is not yet nor can anyone say what the end will be. But this much is sure: *The coal-mine seizure has made men think.*

And it is in the hope of providing some basis for constructive thought that *Coal Age* presents this analysis.

POLITICS SETS THE STAGE

THE COAL-MINE SEIZURE reflects far more than an attempt to cope with the grave production problem precipitated by a defiant labor leader. Rather, when the administration chose this way out, it confessed its complete failure to capitalize on an unparalleled opportunity for developing a workable labor-relations policy that would safeguard not only the rights of employer and employees but also the rights of government and the nation as a whole.

What have been the consequences of this failure? Aside from an employer group being penalized for a situation arising out of an attempt by a labor leader to breach the government's wartime stabilization program, the country has lost vital coal and steel. It has been confronted with a proposal that the army be used to whip workers into line. Miners lost wages at \$3,500,000 per day, not to mention standing in the eyes of the public. And miners and labor in general are now subject to legislation the wisdom of some parts of which is debatable, despite its avowed purpose of eliminating production interruptions arising out of labor controversies.

This legislation, furthermore, confirms seizure as a national policy, for the duration at least, although it still remains to be demonstrated that seizure is even an emergency answer to the problem. The fact that legislation could be offered and passed over a veto reflects, however, the country's growing impatience with boondoggling and special privilege in the labor field—a good omen for the future.

How did we arrive at the point where one man could defy the government—and the government could find no way out but seizure? The inescapable answer is politics—the brand of politics that favors one class over another. The New Deal and John L. Lewis, in fact, are the combination that has presented the nation with one of its most difficult problems at a time when it is in a war for survival.

The 20's and "No Backward Step"

Lewis arrived on the scene long before the New Deal and lost no time displaying a quality that has figured prominently in the 1943 crisis—"no backward step." When he took over in 1919, the United Mine Workers had a membership of about 435,000 (some 390,000 paying dues). The base bituminous wage scale was \$5.70 per 8-hour day, compared with \$3.60 in 1917 and \$2.98 in 1916.

Within ten years the Mine Workers' empire had shrunk to the anthracite region, Illinois, Indiana, Iowa, parts of the Southwest and the Rocky Mountain regions and scattering operations in the few other States. Lewis started well, securing increases in base bituminous rates to \$6 and then \$7.50 in 1920. Why, then, should the union have lost so much ground in the years to follow? The major reason was Lewis' refusal to entertain any suggestion that the economic course of the industry might warrant his sympathetic consideration. For instance:

1. Under wartime necessity and with government encouragement, coal mining had built up the biggest producing capacity in history. An asset in war but a liability in peace, this overcapacity had to be liquidated—by the industry and at its own expense.

2. The trend toward increased efficiency in coal use, initiated as a war measure, sharply reduced the requirements of major consumers in the years to follow and made capacity liquidation even more difficult. Between 1920 and 1930, coal used in electric generation dropped from 3.0 to 1.62 lb. per kilowatt-hour; road locomotive service, from 174 to 121 lb. per 1,000 gross ton-miles; pig-iron manufacture, from 2,305.6 to 2,046.8 lb. per gross ton of iron, etc.

3. Oil, natural gas and other substitute fuels and energies, which got a foot in the door in World War I, became increasingly severe competitors, reducing coal's percentage of the total mineral-fuels supply from 80.7 in 1920 to 64.3 in 1930.

4. Average realization steadily declined. In 1920, it was \$3.75 per ton for bituminous coal (U. S. Bureau of Mines figures). In 1930, it was \$1.70, a drop of \$2.05 in ten years. The anthracite post-war peak was \$5.62 in 1926, following signing of a five-year contract continuing the wage levels reached by raises in 1920 and 1923. By 1930, the average had dropped to \$5.11 per ton.

But what did Lewis do? He held the base bituminous scale at \$7.50 until April 1, 1927, by which time the damage had been done. The "no-backward-step" formula, running directly contrary to the economic course of the industry and ruling out operator appeals for adjustments in line with the times, resulted in a revolt which cost the union most of its bituminous membership. A similar policy in anthracite threw a heavy burden on that industry at a time when it was in a critical struggle to maintain its position and undoubtedly caused it to lose more ground than it would have otherwise.

By staking everything on his formula when a policy of sympathetic cooperation certainly was called for, Lewis not only cost the union most of its gains but prevented it from retaining a position which would have enabled it to offer a sorely needed stabilizing influence at a critical time. Now, he has again refused to yield and once more the question is: Will the miners suffer with the industry and the public?

The 30's and Class Politics

The New Deal rescued Lewis from the consequences of his first refusal to modify his policy and by class politics put him in position to defy government and public opinion. When the New Deal came into power in 1933, U.M.W. membership had dropped to 140,000 to 165,000, only 50,000 to 75,000 of which was bituminous. The coal industry, just beginning to come out of the years of liquidation, had been flattened by the Great Depression and was seeking a workable stabilization program.

Sec. 7(a) of the National Industrial Recovery Act put Lewis back into business. By June 16, 1933, when the measure became law, a whirlwind organizing campaign had brought most of the miners into the union fold. The majority of the operators cooperated with both the letter and the spirit of the proposed legislation.

The first Appalachian wage agreement, setting the pattern for agreements in all other fields, was signed Sept. 21, 1933. Base wage scales were \$4.60 in the North and \$4.20 in the South, 8-hour day. On April 1, 1934, the National Recovery Administration ordered, under the guise of an "emergency," a 7-hour day and rates of \$5 and \$4.60. Rates in other regions went up accordingly. Before 1940, three other agreements were negotiated: Oct. 2, 1935, \$5.50 and \$5.10; April 2, 1937, \$6 and \$5.60, with time and a half over 7 hours a day and 35 hours a week and a maximum working time of 8 hours daily and 40 hours weekly; May 13-July 19, after presidential intervention, no increase in wages but exclusive bargaining privileges.

Two anthracite agreements, besides those of 1920 and 1923, were negotiated: May 8, 1936, no change in wage scales, 7-hour day and 35-hour week after April 30, 1937; May 27, 1939, no changes in wages and hours, "union shop" conceded by the operators.

N.I.R.A. went out on the wings of a sick chicken May 27, 1934, but its operation had so benefited both operators and miners that attempts to enact special legislation got under way immediately. On Aug. 30, 1935, the Bituminous Coal Conservation Act of 1935 became law. Its labor provisions, written by the union, tripped it in the Supreme Court May 18,

1936. It was succeeded by the Bituminous Coal Act of 1937, which assured at least the weighted average cost of production and pleased the miners, who saw in it a potent justification for wage increases.

But while these developments were assuring the operators and miners of help with some of their problems, the New Deal's cardinal principle that labor—meaning primarily labor unions—could do no wrong was serving as the foundation for extensions of the road to seizure. The National Labor Relations Act was a case in point. It lent legal color to the philosophy that wrongs could be committed by employers only. The anti-trust, anti-collusion and anti-conspiracy acts, drawn to include everybody else, excluded labor, and the Supreme Court freed the labor unions from the jurisdiction of the anti-racketeering act. The unilateral character of this legislation, in effect making it punitive rather than an incentive to cooperation for mutual benefit, was its outstanding defect. The results were inevitable. Labor unions and labor leaders, with no responsibilities and a free rein, were bound to conclude that they could maintain their demands even against the rights of a people at war.

In such an atmosphere it was natural for labor leaders to do two things: make sure that the situation continued and grab for more power. Lewis let little grass sprout under his pedal extremities. In 1934, he sold the U.M.W. convention on forming industrial unions in the American Federation of Labor and transferring union headquarters to Washington to be closer to the seat of political power. By 1936, in addition to the ubiquitous

District 50, he had organized the Committee for Industrial Organization, which became the Congress of Industrial Organizations in 1938.

Lewis' intention to lean more heavily on political advantage became especially evident in 1936 with his organization of "Labor's Non-Partisan League," devoted to the reelection of Roosevelt. To this end, the United Mine Workers, by loan and gift, contributed \$500,000. That \$500,000, and what it stood for, was to have far-reaching consequences. Regardless of any different ideas the recipient may have had, Lewis felt he had bought something and lost no time in demanding delivery. With the political weather what it was, perhaps he was justified in his belief. What he got was a quick brush-off. He's still getting even while the administration covers its lack of a sound labor policy by resort to seizure.

The United Mine Workers was not the only organization to cash in on the New Deal platform. All labor unions racked up major gains in this period. But was there progress in a national labor relations policy which would offer the employer some incentive to participate other than punishment if he did not? Certainly not in the National Labor Relations Act, nor in the actions of federal officials, boards and agencies. Rather, employers were handcuffed and labor was given *carte blanche* to do what it would.

Furthermore, the New Deal did not hesitate to enter into alliances with labor and accept its cash to keep itself in power, with the inevitable result, when it could not or would not deliver, of disagreement, bitterness and a spirit of revenge and defiance of controls. Thus, the powder charge was laid, awaiting only the match to set it off. And class politics put Lewis in a position and a mood to apply the match.

The 40's and Collapse into Seizure

This, then, was the situation going into the 40's. Other than "labor can do no wrong" the New Deal had no policy, while its attempts to play class politics with Lewis had made of him an enemy of no mean proportions. But it was not until the war made relatively rigid stabilization measures a necessity that Lewis really came to grips with the administra-

tion and thus put the finishing touches on the road to seizure.

The main bout, however, was preceded by a few preliminaries. Lewis came out for Willkie on Oct. 24, 1940, and resigned his C.I.O. office when Willkie lost. And in 1941, the administration's poverty in the field of labor relations was again revealed in the captive-mine dispute.

Meantime, another wage boost of 7½ percent to Oct. 1 and 10 percent thereafter was included in the anthracite wage agreement of May 20, 1941. An anthracite production control and allocation plan was approved by the Pennsylvania legislature and signed July 7. A campaign to eliminate the southern differential split the Appalachian conference in 1941. After the President had intervened and the southern group had yielded for the sake of the defense effort, contracts finally were signed raising base rates from \$6 in the North and \$5.60 in the South to \$7 all around.

With that out of the way, the captive mines were struck Sept. 15, 1941, to force a union shop. The National Defense Mediation Board intervened,

tion measures, plus other concessions and portal-to-portal pay. The legal precedent for the latter demand was a Court of Appeals decision affirming an order of the Wages and Hours Administrator in the metal-mining industry.

The portal-to-portal demand was a complete about-face for the union, since its legal counsel, July 9, 1940, had joined with the Appalachian negotiating committee in requesting that the principle of pay for time worked at the face be approved. This request declared that "the uniform high rates of pay that have always been included in the wage agreement of the mining industry contemplate the employee's working day beginning when he arrives at his usual working place."

request a review of the issues by the agencies set up for that purpose. Stripped down to its elements, the latter was compliance with stabilization policies and with the rules laid down for the settlement of disputes.

Why, then, should the question of seizure ever have come up? The answer was Lewis' refusal to submit to such rules or even admit that they existed. Regardless of possible debate as to the whys and wherefores, the case did go to the appointed government agency and Lewis did refuse to admit its existence, pointing up his refusal with work stoppages. Confronted by the refusal and without a sound policy of coping with it, the administration again chose to use sleight-of-hand methods.

What were the circumstances surrounding the seizure? The War Labor Board got the case April 22; the President April 28—two days before the first truce expired. Did he call the parties in for a meeting? Did he issue a warning that continuation of the dispute might result in seizure? Did he, in fact, do anything to secure a settlement that would avoid more drastic action? The record does not show it. Rather, it indicates that he called for the hat and got ready for the production of two superior rabbits—better rabbits than ever before. One was seizure May 1. The other was a radio speech May 2. Time was soon to show that Lewis and the miners were impressed by neither. Legerdemain had failed and left no other course but to continue to penalize the operators for complying with established procedure while Lewis put the miners back to work on his own terms.

Thus seizure became indefinite retention, while millions of tons of vitally needed coal and thousands of tons of precious steel were sacrificed. Thus mine workers lost millions in wages and favor in the eyes of the public. Thus, the Connally-Smith act was made possible in the face of a veto, despite its debatable features and its affirmation of the seizure policy. Thus, the consequences spread far and wide while Lewis suffered nothing except perhaps the temporary thwarting of his plans.

But the record is not wholly black. Aroused public opinion is a potent incentive to progress. With the fact before it, it can wipe out "an intellectual interest in labor but no practical understanding of labor relations" and replace it with a sound program assuring employers, employees and the public alike of the benefits inherent in good labor relations.

WHAT THE STRIKES COST

Up to July 1, mine stoppages had cost the Nation 27,000,000 tons of coal and 170,000 tons of steel — enough for:



43,500 P38 Lightning Fighters

— OR —

16,000 B17 Bombers



— OR —



6,000 Medium Tanks

— OR —

38 Liberty Ships



but met the fate of other bodies before and since when its course ran athwart that of Lewis. He refused to recognize it. The dispute consequently went to the President, who declared that "the Government of the United States will not order, nor will Congress pass legislation ordering a closed shop." But Lewis got his way through the medium of an arbitration panel suggested by Roosevelt and composed of himself, Benjamin F. Fairless and Dr. John R. Steelman, director, U. S. Conciliation Service, who resigned temporarily "to represent the public." With Lewis and Steelman voting together, the union won.

When Lewis went into the 1943 Appalachian negotiations, his announced purpose was a substantial wage increase regardless of whether or not it conformed with stabiliza-

This principle was accepted by the administrator July 18 and his division announced to the press July 25 that it considered the face-to-face method of computing working time as not unreasonable. The logical question is: How could it have become unreasonable in something less than three years?

Lewis quickly made it plain that his only basis of negotiation was more money, "hold the line" or not. Where did that leave the operators? They could agree to a wage increase and thus help Lewis break the stabilization program, making himself cock-of-the-walk in labor in the process. Or they could concede portal-to-portal pay, which, in the absence of a final determination of their responsibilities, might also turn out to be a wage increase in disguise. Or they could

WHAT THE PUBLIC LEARNED

NOT ONLY DID John L. Lewis' campaign to break war stabilization measures and make himself monarch in the domain of union labor bring down on his head the wrath of the public, the armed forces, and even other labor-union leaders. It also uncovered deep public dissatisfaction with the New Deal policy of favoring labor unions at all costs and improvising to meet crises arising out of lack of a sound labor-relations program.

When it became apparent that Lewis could and would call his miners out, it became equally apparent that the public appreciated the danger to the war effort and also that he and not the miners was the responsible agent. The Army Mothers' Post No. 11, meeting at Hot Springs, Ark., May 1, telegraphed President Roosevelt:

"Nothing has so seriously interfered with the successful prosecution of the war effort as the present coal strike. The undersigned are requesting that you immediately arrest and intern John L. Lewis, president of the United Mine Workers; his associates and all others responsible for this strike and that they remain interned for the duration of the war."

Internment was one of the milder forms of restraint proposed for Lewis. Even other labor-union leaders deplored his action in stopping production in wartime. Van A. Bittner, a former associate of Lewis, now in the C.I.O., and a member of the National War Labor Board, put it this way:

"I'd sooner crawl through hell on my belly than call a strike in a war industry during this war. What good is it to win a strike in '43 and lose the war in '44? What good is it to win a strike in '43 and have Hitler here in '44?"

The armed services, with by far the most direct interest in uninterrupted production, also had considerable to say about Lewis' actions. Nearly 90 percent of the soldiers polled in North Africa by the Stars and Stripes were reported to favor

drastic government action against strikers and labor leaders who lead strikes. A substantial majority expressed concern that the people back home "still don't know there is a war going on." One letter, signed by three former miners, read in part:

"What are the people back home waiting for? If they don't stop Lewis and his gang now, maybe Hitler will pin that decoration personally on John L. Lewis in Washington. We want to belong to the United Mine Workers of America and not to the United Mine Workers of John L. Lewis."

Anxious for an end to a situation directly endangering the war effort, the public, the press and Congress greeted seizure of the mines May 1 largely with approval. When it became evident, as it soon did, that seizure would not prevent production interruptions, the administration began to share the spotlight with Lewis. It was, the Colorado Springs (Colo.) Gazette observed, June 2, "caught in its own political trap" when it elected to deal with the situation on the basis of "political expediency."

"MY PAL"



Little, Nashville Tennesseean

"Mr. Roosevelt has said that the coal miners are government employees now that the government has taken over the mines, but the fact doesn't follow, nor is the basic issue to be evaded so easily. The question of war necessity cannot be raised unless it is the purpose to serve it fully and impartially. That purpose has so far been deferred to political considerations. The labor problem can be solved any time the administration is willing to face it squarely."

The third stoppage in June, which directly influenced passage of the Connally-Smith bill, brought out still more pointed criticism of the administration's policy—or lack of policy. To quote the Bluefield (W. Va.) Daily Telegraph of June 22:

"The American people know that neither the government nor Lewis are entirely without blame in making this most distressing stagnation in time of war. The government, from the hour of the failure of the mine owners and the mine union to agree, avoided determined action by appeasement strategy, and the union applied the work stoppage as a means to

force compliance with its demands."

Making the point that the miners have been misled and that the government could have prevented interruption of production, *The Rocky Mountain News*, Denver, Colo., had this to say on June 23:

"The renewed coal strike is a symptom of deep-seated and even more dangerous trouble. A government with a firm, fair and consistent labor policy could have prevented the coal strike. Lack of such a policy gave John L. Lewis his opportunity to mislead the miners, defy the War Labor Board and endanger the nation."

Even Lewis had to recognize the storm and bend to it, the *New York Herald-Tribune* stated June 24 in a discussion of his order ending the third stoppage.

"Perhaps one should welcome this conditional capitulation. Perhaps it should be chalked up as a victory for the War Labor Board, whose defiance of its arrogant enemy has brought him to the terms laid down—perhaps. Meanwhile, the immediate victims, of course, are the private operators. Let us grant, for the sake of argument, that some of them, as Secretary Ickes has said, have been stubborn. At no time in the long, critical controversy have any of them questioned the final authority of the War Labor Board or displayed other than complete willingness to obey its instructions. On the contrary, whatever stubbornness they may have interposed to Lewis' demands was predicated on their oft-expressed desire that the board adjudicate the dispute and tell them the kind of a contract to sign. So now, for their pains they must relinquish their properties."

Passage of the Connally-Smith bill brought out a new crop of editorial comment in the same general tenor. The *New York World-Telegram*, in its June 26 issue, pointing out that Congress had gotten a "bellyfull," had this to say:

"Anger at John L. Lewis and dissatisfaction with administration failure to deal firmly and effectively with the intolerable Lewis obstruction of the war program help to explain this stinging defeat of the President. But, more fundamentally than that, it was a rebellion against a governmental philosophy with which most of the American people, like most of the members of Congress, are fed up to the teeth."

The fact that Lewis' course was in fact a disservice to the miners was the theme of considerable comment, which made the point that in the end it might do major harm to labor in general. As the *Chicago Times* put it:

"Labor can't blame the President. It can't blame Congress. It can't blame the miners. It can blame John L. Lewis. The President's idea is that the draft age should be upped to 65 so that the strikers may be inducted into non-combatant military service. That didn't click. In the first place, Lewis doesn't go on strike. It's the miners who strike, and nobody wants to take out on the miners what ought to be taken out on Lewis."

A Cue for Operators?

Three things stand out in this brief survey of public opinion. One is that the country objects violently to labor leaders who would call strikes in wartime, whatever the reason. The second is that the country is aroused to the dangers of a labor policy that permits a labor leader to challenge the power of government, especially in time of war, and—so far—get away with it.

The third thing is less obvious but of primary importance to the coal industry. It has often been observed

that coal operators seldom enjoy a "good press." That still holds if comments in the present crisis are any criterion. Despite operator attempts to comply with the rules set up for the settlement of disputes, their side of the picture has been largely ignored except for a few references to the fact that they have been penalized for such compliance. In fact, it has been publicly pointed out, and more often in private, that they had failed to grasp opportunities to arrive at a settlement, the inference being that they were at fault even though such settlement involved scuttling the War Labor Board and the stabilization program, in addition to the implications inherent in settling on a basis of expediency rather than the greatest good of the industry now and in the future.

The coal industry now has or is setting up the machinery to dispel hostility and create understanding and good will among both its employees and the public. Recent events leave no doubt that it should be used to the utmost.

Talbot, New York World-Telegram



WHAT'S AHEAD IN WASHINGTON

S EIZURE OF strike-bound industrial plants is no new thing in this war, but the seizure of an entire industry, for any reason, has only one precedent and that is the government's World War I operation of the railroads. Between that and the current case of the coal mines there is one big, basic difference.

The difference is this. The government planned to take over the railroads in 1918, acting on the theory that operating efficiency would be improved by unified control. Today's seizure of the coal mines, on the other hand, was a spur-of-the-moment rabbit-from-the-hat expedient designed to bail an embarrassed administration out of difficulty with a defiant labor leader.

It was thus possible to gain some inkling in advance of what the government planned to do with the railroads in 1918, whereas today any attempt to predict specific government policy on coal-mine operation is, at the moment, a job for a clairvoyant, a mind reader or both.

It was also possible, in 1918, for the federal railroad administrators, knowing that their task would definitely last for the "duration" or longer, to make practical plans, whereas Secretary Ickes and his new deputy, Carl E. Newton, can't be sure from one minute to the next just how long their job will last.

All they can do, therefore is to cope with problems as they arise and formulate policies as needed. And all Coal Age can do is to visit Washington and conversationally probe (rather than attempt to read) the minds of the officials most concerned. On this basis it is possible to provide some forecast of policy and some insight into the way in which the Washington mind will work.

No clairvoyant is needed, certainly, to recognize that government operation of the coal industry or any other industry is an inherently dangerous thing. At best it ends in the safe return of the industry's properties without too great loss or damage. At



"... I repeat that I know of no plan for the nationalization of the coal industry. I know of no desire on the part of any public official to have nationalization. I think it is one of those pernicious rumors that are deliberately set in motion to embarrass the government."

—Harold L. Ickes

worst it can end in the industry's nationalization. The sooner it ends, therefore, the better.

Certain reassuring features characterize the situation. For example, no mind reader is required to guess whether or not Mr. Ickes desires the nationalization of the industry because Mr. Ickes has said that he does not, very loudly and clearly, with an equally loud "Amen" from Mr. Newton. This is well, for if the men at the helm were so minded they probably could rope, hog-tie and socialize the industry in short order.

Still in a state of transition from "control" to "operation," the Washington outlook is beginning to develop other discernible features, some reassuring, others less so. Here, in question and answer form, is Coal Age's appraisal, based on a probe of all the facts known to date, of the probable trend of government policy:

1. Will existing management be retained?

Yes, says Ickes, "to the extent that it cooperates." (You will notice in all that Washington says a recurrently

PITFALLS IN GOVERNMENT OPERATION

IN GOVERNMENT OPERATION of any industry, certain inherent ill effects reside. Many of them are unavoidable, especially if government operation continues for any great length of time.

But if they cannot be avoided, it may be possible to hold them to a minimum. Foreseen, they may be in part forestalled—by wise government administrators aided by cooperative industry leaders.

The following is an analysis of the potential ill effects, immediate and future, which can result from any amount of government operation, under any auspices, of any industry.

1. Initial confusion and uncertainty attendant on the change from "control" to "operation"—in itself a possible cause of losses in production and efficiency. Some of the questions which give rise to such uncertainty are these:

- a. Is nationalization intended?
- b. Will existing private management be retained and on what terms?
- c. Should executive decisions of importance be postponed?
- d. Will management be indemnified for losses suffered as a consequence of compliance with government operating orders?
- e. If indemnification is planned, will it be paid promptly or will it be made dependent on prolonged litigation?
- f. Will the proceeds of successful operation be retained by the owners or paid into the government; if the latter, how will they then be disposed of?

2. Creation of a large, bureaucratic, centralized government management organization with personnel running into the thousands which will lay a heavy burden either on the taxpayers or on the industry, if the latter is assessed to support it.

a. An immediate ill effect of overcentralized management is the "splitting" of operating management from corporate management within the industry. If operating management reports directly to Washington, corporate management is left more or less idle.

b. A long-range danger is the tendency of bureaucracies to perpetuate themselves, whatever the "emergency" nature of their origin.

3. Injection of the industry into politics, especially if appropriations for government management and maintenance of the industry must be debated in Congress.

4. An unwise or expedient maintenance policy—a policy of under-maintenance through which:

- a. Management may lose opportunities to improve production.
- b. Properties may lose value in subtle ways for which indemnity may prove difficult to obtain.

5. Withholding of funds due to rightful claimants.

6. Unreserved capitulation to the demands of labor.

a. An immediate ill effect is the contribution this policy makes to the rising danger of inflation.

b. A long-range danger is that it may put the industry in an economically untenable price position.

7. Loss of the normal incentives to efficiency and economy; also undermining of discipline, especially on the part of employees who, under their new status, neither strive to please nor fear to displease top management.

8. Forgetfulness of the proper regard for a businesslike ratio between expenses and revenues. This factor contains grave post-war implications. If the price of an industry's product is driven completely out of line, that industry may fall easy prey to the competition of rivals. And no industry on earth today can dare to suppose that it is safe from competition.

9. Loss of the advantages of competition within the industry.

10. Weakening of the industry's credit, a result of all the foregoing combined. This will make it just so much harder for the owners of properties to "pick up the pieces" when government operation ends.

11. Promulgation of national operating orders from Washington which, under certain local conditions, may prove inapplicable or actually detrimental to production.

similar note. To the operator, who feels justly that he has been made the "goat" of a political fracas, this may seem a little hard to take. It's there, just the same—the attitude that the responsibility is on the operators to cooperate and produce; that it will be so much the worse for them if they don't. And, to be realistic, it probably will.)

Says Ickes further: "We hope we will get along so well we won't have to make any changes [in the existing private management personnel]." Asked what the reasons for any changes might be, he said: "Anything that would slow up or cause a hiatus in the mining operations."

2. Is there any indication that mine-operating personnel will be put under civil service?

No.

3. Will management continue to discharge its usual duties?

Yes, according to present plans. It cannot be said with certainty but it can be assumed, until further notice, that management will continue to handle disbursement and accounting of funds, recruitment and supervision of personnel, operation, purchase of equipment, sales and other normal management procedures.

4. Should executive decisions of importance be postponed?

The word probably will go forth from Washington before long: "Go ahead with anything that will increase production."

5. Is the payment of indemnities contemplated for operating losses suffered as a consequence of government operation?

"What losses can there be?" asks Washington. The policy on this point is far from clear. Officials say they will resist with vigor any attempt to get a "handout," yet they have shown considerable interest in helping one or two operators who have claimed inability to meet their payrolls.

6. What disposition is to be made of operating profits?

Another highly uncertain situation. "Profits," said Ickes at a recent press conference, "will all go into the Treasury. None can be taken out without our consent and we'd have to pass on it—we haven't laid down a definite policy yet in that regard—we are holding such things in abeyance, since we have asked Mr. Newton to take over." From Newton, on his first day on the job, no comment.

7. Is creation of a big government operating agency in prospect?

Neither Ickes nor Newton, apparently, wants to call into being a gigantic band of gleeful bureaucrats intent on perpetuating themselves in jobs forever. A modest organization chart has been drawn up for Newton's approval. It suggests a field force of only about 400 or 500, augmenting the activities of existing staffs.

8. How will government operation be financed?

Out of government funds, according to present plans. Ickes got some \$10,000,000 initially from the President's emergency fund. He has an arrangement to obtain further funds, as needed, from RFC. Without specifying how, he expresses hope that the operation of the mines will be "self-financing."

9. Will present methods of distributing coal be continued?

Question (by Coal Age, at a press conference): "Do you expect to make any changes in the distribution set-up; that is, in coal-sales activities and others?"

Answer (by Ickes): "No, I have nothing in mind in that connection right now."

10. What will be the government's policy on maintenance and improvement of coal-mine equipment and property?

It's too soon to say. The matter has been discussed at length by Ickes, Newton and the operators' committee. Officials were inclined to put it up to the committee to work out a policy and a concrete plan (1) to keep equipment at a productive peak; (2) to propose an equitable method of allocation of orders and financing of payment so that manufacturers may be paid promptly and the question of payment kept out of politics. Officials feel the formulation of such a plan is up to the operators, saying "The plan the government promulgates won't be as happy as the one they work out for themselves."

11. What is the status of the industry committee?

To date, its official status has not been decided.

Mine-Operator Newton

If ever a man came to Washington with his eyes wide open, that man is Carl Elbridge Newton.

Many a businessman, serenely confi-

NEWTON'S JOB AS HE SEES IT



Harris & Ewing

OUR SOLE OBJECTIVE is the maximum production of coal in the national interest. This we shall strive to achieve with a minimum of governmental interference with the existing set-ups and procedures of the industry.

The extent of such interference undoubtedly will depend considerably upon the degree to which we are able to integrate and utilize effectively the long established existing elements of the industry. The coal mines are in the hands of the government today. Fortunately that is not the result of a general breakdown of all the industry's component parts. The industry has, however, broken down at one vital point—that of labor relations. And it is the task of Secretary Ickes and myself to keep the machine running until repairs can be made by those whose responsibility it is to do so.

I hope that government operation of the mines will be short-lived. I hope we may succeed in avoiding, or at least substantially lessening, the undeniable dangers to this industry—and, in fact, to all industry—which prolonged government operation, under any auspices, will inevitably foster.

These dangers can be greatly minimized by the voluntary and wholehearted cooperation of the coal-mine managements with the government in the period of federal operation. The voluntary cooperative method is, to my mind, the best, most efficient, and most productive method in nearly all cases. It is on this method that I propose primarily to rely. If, however, in some instances more drastic measures become necessary in order to get coal production, then I shall not hesitate to employ drastic measures.

Production comes first because the safety of the nation comes first and the safety of the nation is at stake. But I want the readers of Coal Age to know that I am assuming this post as a firm believer in the private management of industry. I have always believed that "that nation is best governed which is least governed."

I have confidence that ultimately the industry can realistically come to grips with its critical problems and formulate the basis for restoration to its proper place as an independent, effective unit in the American economy. Until that time, however, the government must see that the coal is produced which is essential to the preservation of our national independence and liberties. —CARL E. NEWTON

Deputy Federal Coal Mine Administrator

dent in his apparent authority, has marched bravely into the capital amid the familiar fanfare accorded to all prominent appointees only to find himself presently enmeshed in red tape, hamstrung by lack of authority, surrounded by spies and dogged by political enmities in whose making he had no hand.

No news to Newton are governmental red tape and delay. This is neither his first trip to Washington nor his first fling at government service. His aversion to red tape dates back 20-odd years to his days as a young prosecutor in the federal District Attorney's office in New York. He still remembers his youthful dismay at discovering that triplicate forms had to be signed and countersigned on dozens of desks over a period of months in order to accomplish the minor bureaucratic miracle of a dollar's worth of soap for a washroom.

Ever since then he has opposed government operation of industry on the ground that it stifles initiative and obstructs progress.

No news to Newton, either, are the palace politics and intrigues which beset the innocent businessman who comes to Washington all starry-eyed in the simple belief that he is there to do a job. Newton is well aware that not everyone he meets in the government will share his own passionate advocacy of private management. He knows full well the ritualistic importance of "channels" and the perils of crossing swords blindly with Congressmen. And he knows, above all, that his authority is distinctly limited.

Forewarned is fore-armed. Yet Newton has been heard to observe that he will be one of the least surprised men in the world if it turns out that he, too, is merely marching toward the block where the heads of so many businessmen have rolled before.

Why He Accepted

Why, then, knowing the risks, did this alert citizen whose 45 years have already been amply crowned by the presidency of the Chesapeake & Ohio, accept the dubious and dangerous honor that has become his as Deputy Federal Coal Mine Administrator?

His chief reasons are two. The first and best is his belief that every man owes it to his country to accept and do a war job, no matter how bleak and thankless the task may be. The second is based on an honest dread of nationalization of the coal industry. He considers this danger very real—almost inevitable, in fact—if government op-

eration should continue long enough.

So he took the job to see what he could do (1) to help get out the coal; (2) to hold the ill-effects of government operation to a minimum; and (3) thus stave off nationalization. For if the coal industry tumbles permanently into Uncle Sam's basket, then, Newton believes, it will be followed eventually by the railroads, steel, the utilities and God knows what else. He reasoned also that if he were to turn down the job it might fall into the hands of someone who cared less for private enterprise than he.

Differs on Some Issues

That's the "plus" side of the Newton appointment.

Coal men won't unrestrainedly toss their hats in the air, however, if they're looking for a man who sees eye to eye with them on every point. Newton doesn't. For example, he is inclined to share Ickes' view of the operators' strategy in the recent wage negotiations. Ickes, it is well known, thinks the industry negotiators were too inflexible, that they might possibly have averted seizure if they had made a united counter-offer on portal-to-portal. Ickes, in fact, offered to carry the ball for such a deal at the White House.

Newton, incidentally, took cards unofficially in the Ickes corner of the negotiations game at the time. Some coal men have resented this. Newton's friends reply that he felt it was the duty of everyone connected with the industry, directly or indirectly, to try to head off seizure by any possible means. Plus this, he agreed with Ickes that production must, at all costs, continue.

For that matter, Newton probably won't see eye to eye with every coal man on every issue that arises out of government operation. It's too early to tell what form these issues may take but one example might be indemnification for losses claimed as a consequence of compliance with government orders. Another might be sheer refusal to comply with an order for reasons which seem, to the operator, sufficient and good.

Ickes himself—and bear in mind that Newton must work under Ickes in a manner satisfactory to Ickes—has the reputation of giving business a pretty fair shake in such situations as this unless he gets the idea that there is skulduggery afoot. He cracks down hard on anyone he suspects of demanding inordinate profits or clinging unreasonably to a business-as-usual attitude.

Likable but Determined

Newton, a businessman himself, won't enjoy discrediting other businessmen but he won't hesitate to hit hard at anyone who opposes his program for reasons which seem to him unjustifiable. There is a strong vein of hard determination in his affable, modest and likable nature. And he won't be deterred in the execution of his policies by the threat of litigation.

"You can tell 'em Newton isn't afraid of lawsuits," he was heard to observe not long ago. And why should he be? He's made his living in the legal ring for years, gaining a national reputation as one of the shrewdest of trial lawyers.

The real key to Newton's attitude resides in his conviction that something resembling nationalization inevitably will attend any greatly prolonged government management of the coal mines. This, he thinks, would be true under any political administration. There is nothing desirable about government management in itself, he believes, and the sooner it ends the better.

The best job Newton can do in the meantime is (1) utilize the existing coal managements to the greatest possible degree and lay upon them a minimum of regulatory orders; (2) prevent the creation of a vast governmental operating machine of the self-perpetuating sort that will permanently burden the industry, nationalized or not; (3) confront the public and Congress with an industry record of teamwork and achievement so completely beyond reproach that no one will desire or advocate nationalization.

His Hopes and Fears

His highest hope is that the industry will voluntarily, in its own councils, find answers to many of the operating problems for which government will otherwise have to set up cumbersome machinery. His worst fear is that the industry may slide unwittingly into the habit of reliance on government, lose its initiative and fall final prey to the forces of nationalization.

So win or lose, Newton will be battling sincerely, as he sees it, to help an industry vindicate its right to manage itself. He is wide awake to the perils that lie before him and if he is decapitated, as he rather thinks he may be, he will know how it happened and why. Or, as he recently put it:

"I expect the incidental results of the job will be substantial headaches and much personal abuse—which I shall try not to merit."

COAL'S BIG JOB: GOODWILL

COAL MINING has just had a severe jolt. The full measure of its effects are still to be determined. Preoccupation with the problem of getting its properties back, after fulfilling its responsibilities of production, naturally rules the industry. But is there a bigger, more fundamental question that should not be forgotten—the question of how what happened did happen and what needs to be done to prevent a recurrence of this or another equally serious situation in the future? The bedrock fact is that coal mining has been penalized because its policies and accomplishments are not appreciated by the public or the miners. The condition indicates the remedy.

What was the most significant aspect of the press comment in the present crisis?

John L. Lewis was roundly and universally denounced for his arrogant misuse of power.

The administration was denounced for putting Lewis in a position of power.

The War Labor Board was denounced in some quarters for allegedly bungling its part in the negotiations.

Even the miners were criticized for allowing Lewis to mislead them so shamefully.

But: where was the praise for the coal operators' course? At best, it was half-hearted and spotty. And it didn't register on the man in the street.

What About Coal?

Perhaps the time has come to ask: Do coal, coal mining and the coal producers stand one whit higher in public estimation than they did 10 or 20 years ago? The answer is: probably not.

Lewis carries many marked cards into every wage negotiation—the marked cards of political prestige, unscrupulously used, and invective oratory, also unscrupulously used. One of his best cards—on which he has capitalized to the utmost again and again

—is the far-too-widespread belief that the downtrodden miners are incessantly abused by the greedy operators.

This belief, and well Lewis knows it, finds credence with Mr. Average Man and his wife, with many public officials, with a surprising number of businessmen and with most of the miners themselves. When Lewis played the same old card again, it took the same old trick.

The result? When the mines were thrown into the hands of the government—penalizing the operators for Lewis' stubbornness—there was little or no public protest. The injustice is apparent to the industry, but not to the public. As a matter of fact, a sizable segment of the public emerged with a hazy notion that seizure was some sort of rebuke to Lewis.

\$64 Questions

Any operator knows that the industry had little choice throughout the negotiations, that it was hopelessly caught in the crossfire between Lewis and the administration. But does the public know it?

Any operator can cite chapter and verse to show that the profit margin in coal is so low that wage increases can be supported only by price increases. Does the public know it?

Any operator can prove that miners are among the highest paid workers in all industry. Does the public know it?

Any operator can show that the industry, after years of profitless operation, has performed wonders in war production with a very modest return as its reward. But does the public know that, either?

It's a fairly safe bet that if the government were to attempt to seize the railroads today there would be a public protest. The railroads have not only done an outstanding war job—they have proved it. They've not only proved it—they've made it known. It would be hard to convince the public that the government could do a better job of running the railroads than the

railroads have done on their own hook.

The chain stores may be a case in point. They discovered one day that their customers didn't like them very much, despite the fact that they had millions of customers. When they investigated this paradox they also found that they were disliked by the farmers although they were one of the farmers' best customers. But they were due for a still greater shock. For when they looked closer, they discovered their own employees didn't like them very much either.

Customers, farmers, and even employees looked on with approval while one State legislature after another slammed through punitive taxes on chain stores so high as to threaten their very existence.

The logical answer was creation of a better understanding of the fact that chain stores: (1) bring better standards to consumers, and (2) provide farmers with a stabilized market for more goods than they could otherwise sell. The chains then embarked on a comprehensive labor relations program and hired experts to help them. Before long, they began to win friends. The threat of punitive taxation gradually vanished. By developing a sound backing of public opinion, based on confidence in themselves, in their products and their methods, the chains had not only saved themselves but had improved themselves as well.

A Day's Work?

This wasn't done in a day nor was it easy. It may not be any easier to root out some of the stubborn fallacies about coal mining which flourish in the public mind, such as:

1. Coal is a dirty, black, disagreeable necessity that probably will continue to be useful only until some substitute can be found.
2. Coal mining is unnecessarily hard, dirty and dangerous.
3. Coal miners are poorly paid.
4. Coal miners are forced to live

under the most deplorable conditions.

5. Coal companies habitually chisel their employees and strive to prevent them from bettering their condition.

The miners themselves share some of these beliefs and cherish some additional ones of their own, to wit:

1. Coal companies deliberately hold down wages to increase profits.

2. Coal companies conspire with consumers to prevent miners from bettering their condition.

3. Wage increases can be absorbed by coal companies or—at the worst—they make only a negligible difference in price.

operation be the day on which it begins systematically to undo the damage caused by deliberate untruths, deliberate or unwitting half-truths and irresponsibly mistaken or idle notions carelessly repeated?

What to do? First it must be accepted that favorable public opinion cannot be bought (that's been tried) but must be earned by sincere word and deed. The coal industry has earned a higher measure of public esteem than it has received. The facts remain unknown because they have not been made known. They should be made known, actively, aggressively. The tools of public information

any unnecessary tampering with the industry.

But is the creation of favorable public opinion the only measure that needs be taken? A realistic analysis of the situation makes the answer no. One serious stoppage can tear down years of work in the public domain. So the creation of understanding of the industry's problems by its employees certainly ranks equally with building public understanding.

Thus, the work of recapturing favorable public opinion must begin in the home community because it must have its roots in harmonious labor relations—not just armed-truce relations but lastingly sound relations based on the employer's demonstrated interest in the employee as a person and in mutual understanding, between employer and employee, of common problems.

It might be argued that the basis for a good understanding already exists. The development of the present crisis, however, makes it painfully apparent that there is something lacking—at least in the viewpoint of the public if not in other quarters. Were it otherwise, the miners might not have supported a course which also put them behind the eight ball. Here again, the operator's task is clear. It involves, first, a sincere attempt to search out and eliminate any practices which could lead to misunderstanding and, second, the use of all possible means of informing his employees and enlisting their interest and cooperation.

Cooperation naturally requires some practical basis for working together. Just now, as the nation's powerful war machine lashes out at the Axis on a global front, management and labor are reuniting their forces in a revival of the WPB "Victory Production Committees." An impressive number of employers in every sort of industry have found that these committees bring results. They might not be the answer in coal mining or even an answer. But any proposal which might lead to better understanding ought to be worth thinking about today.

A start has been made—witness the work of both established and new industry-wide organizations. Local groups have done yeoman work in their own regions. Now, there is every incentive for carrying on—on an even larger scale and with the broadest possible objectives. The job is big but the rewards in understanding and cooperation for the advancement of the interests of the industry, of its employees and of the public are even bigger.

"KEY MEN"



How the coal industry fares with its employees will reflect in how it fares with the public. Miners therefore must occupy a leading place in any program directed toward improving coal's stature in the public eye.

4. Coal companies will not cooperate with employees because they want to protect swollen profits.

5. Coal companies are not to be trusted to consider the miners' welfare.

Because such impressions prevailed, the coal industry was less able to cope with the damaging succession of attacks which landed it unhappily, if not irretrievably, behind the eight ball on May 1, 1943. Will the day on which the industry starts back toward permanently recognized independence of

should be employed to every necessary extent. Americans stopped looking for better mouse traps years ago; they now wait for salesmen to beat a path to their door.

The merits of coal, its vital role in war and peace, how it is mined, who gains a livelihood from it and what influences its cost are too little or not all appreciated by those who buy and use the industry's product or who benefit directly or indirectly from its production. The public, when it understands, will look with less favor on

COAL-OIL FUEL

Will It Take Hold as an Oil Stretcher?

Coal-Oil Mixtures Come Into the Picture as Oil Savers for Plants That Cannot Convert—Besides Stationary Installations, Possibilities Include Marine Service, Steam Locomotives and Home Heating

IS COLLOIDAL FUEL a possible stretcher for oil on a permanent basis in addition to the present wartime emergency period? Current tests, such as that described in the article beginning on p. 51 of this issue, indicate that colloidal fuel has encouraging possibilities as an oil saver at plants which cannot convert to coal. The potential savings through its use are placed at 15,000,000 bbl. annually in Districts 1 and 2 by the marketing division of the Petroleum Administration for War. Coal required to effect this saving is estimated at 3,000,000 tons per year.

The question is: Will the wartime applications, if made, extend over into the post-war future? And will the use of colloidal fuel spread if it gets a start now? The savings quoted in the previous paragraph are limited to fuel oil used in stationary plants for power generation, processing and heating in the two PAW districts. There still remains the possibility of employing colloidal fuel in marine service, in locomotives and in the home, to mention but a few, assuming that liquid fuel must continue to be made available for at least a part of these applications for some years to come.

Colloidal fuel is, briefly, a mixture of finely ground coal and fuel oil. Oil is saved roughly in proportion to the quantity of coal added. On the basis of the usual mixtures, which run 30 to 40 percent of coal by weight, successful use of colloidal fuel would effect a saving of about one-third in oil consumption. Mixture stability is a major problem. As far back as 1879 experimenters tried adding "stabilizers" or "fixateurs" to the mixture to keep the coal in suspension. Numerous patents cover the use of metal soaps, fatty acids and coal tars for this purpose. For stationary power-plant use, especially, the trend today is toward grinding the coal fine enough to prevent settling or using some mechanical means of keeping it in suspension.

Government investigation of col-

loidal fuel as a possible answer to the oil problem began more than a year ago in the form of technical studies by the Bureau of Mines to find out what had been done by past experimenters and lay down the best approach to the problem.

"The earlier investigations that were carried on during the past year or more," declares a late summary on the "Colloidal Fuel Program," prepared by the PAW marketing division, "indicated very definitely that a coal and oil mixture, with the coal pulverized only to 90 percent through 200- or even 350-mesh, would not have the coal stay in suspension over a sufficiently long period to permit its storage at the point of manufacture and delivery through tank trucks and into the storage tanks of the consumer.

"It is, therefore, apparent that this fuel could not be used to the maximum advantage without requiring the consumer to erect coal pulverization, mixing equipment, etc., at the point of consumption. The method would be more or less futile in the reduction of oil consumption for the reason that the plants with the average storage for such installations could properly be considered as subjects for complete conversion from oil to coal. A second and very serious objection to this plan would be the excessive use of critical materials for the manufacture of the necessary fuel-preparation equipment.

"We, therefore, directed our investigation into the field of the preparation of a colloidal fuel that could be manufactured at a loading rack where it could be stored and delivered on order either by barge, tank car or tank truck to the point of consumption. This plan would result in minimum use of critical materials and the maximum distribution in the industrial areas in exactly the same way and with the same means as No. 6 fuel oil has heretofore been handled from the loading racks of the various oil companies."

The preparation of stable oil-coal

mixtures was studied intensively in 1917 and 1918 in connection with the work of the Submarine Defense Association, reports W. C. Schroeder, principal fuel technologist, Bureau of Mines. Since that time, however, there has been, until the present, very little interest in the subject in this country, probably because of the low cost of fuel oil. In Great Britain, on the other hand, interest has been spasmodic but it has never disappeared. British experiments included tests in steam locomotives and the liners "Scythia" and "Berengaria." Results of the "Scythia" tests were reported to be generally satisfactory, but on the basis of published information, the "Berengaria" results were less favorable.

"In marine use," Dr. Schroeder points out, "oil-coal mixtures have two fundamental advantages over oil alone. First, coal is distributed more universally and shipping difficulties for at least part of the fuel may be decreased. Second, the heat content per unit of volume is about 2 or 3 percent greater, which allows some saving in bunker space."

"The introduction of coal with a comparatively high ash content into a furnace normally burning oil represents a major change in operation," Dr. Schroeder also observes. "Furnaces frequently are designed to burn pulverized coal, even though the pulverizing equipment is not installed and oil is used. In such instances, introduction of coal with the oil probably would not create serious difficulty. On the other hand, furnaces designed exclusively for oil may have relatively small combustion space, small gas passages and no means of removing ash from the furnace. Here, the mixing of coal with the oil must be done with care, for combustion of the oil may be completed in the furnace while unburned coal particles reach the boiler tubes. The small gas passages may be plugged by coal and ash, particularly if the ash has a low fusion temperature.

"In preparing the composite fuel, certain steps might be taken to alleviate these difficulties. A bituminous coal should be used which has a low ash with high fusion temperature. Grinding as finely as possible will help secure rapid combustion. In this connection, the use of a tar with the coal, which tends to secure some solution of the coal in the oil, may be helpful. It may also be necessary to provide some means (probably by hand) for periodically removing the ash from the bottom of the furnace. There will unavoidably be an increase in fly ash from the furnace. Finally, opera-

tion of the boiler at the same high rating attained with oil may be impossible. The rating that can be secured will depend on the combustion space in the furnace, the size of the gas passages, the amount of ash in the coal and the fusion temperature of the ash."

Organizations carrying on work on colloidal fuel in addition to the U. S. Bureau of Mines include one large eastern coal company, which has not yet published any results, although confirming that the fuel has been in test in road locomotives for approximately a year. A second operating

company, the Pittsburg & Midway Coal Mining Co., Pittsburg, Kan., according to press reports, has developed an oil-coal fuel and is conducting tests which, it is stated, may show that the product also is adaptable to some furnaces.

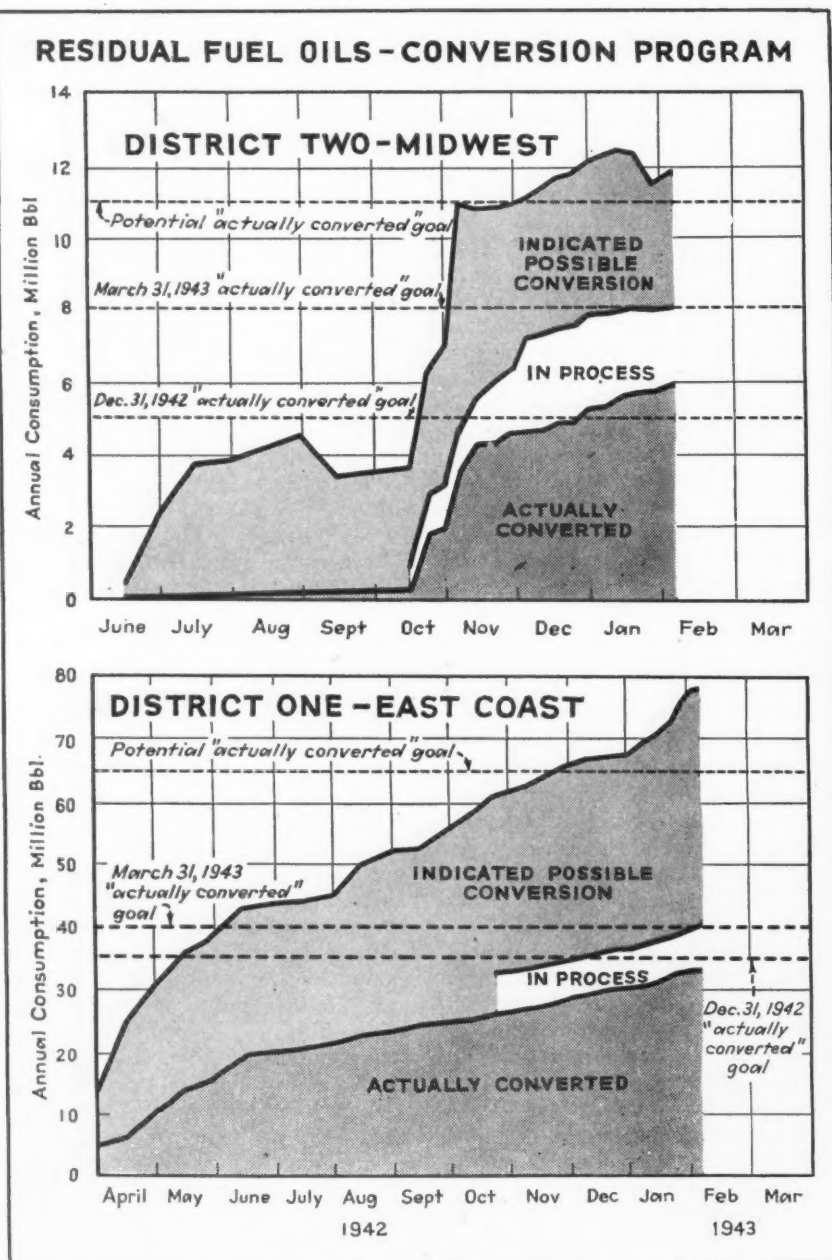
Tests and methods at the Point Breeze refinery of the Atlantic Refining Co. are detailed in the article beginning on p. 51. An entirely different method of preparing colloidal fuel is used at a pilot plant built by J. C. Coutant in New York City (*Power*, June, 1943). Batches of a coal-oil mixture are made up by mixing the coal into oil heated to about 160 deg. F. The mixture then flows to a colloid mill for further grinding. Mixtures made by this method have varied from 25 to more than 50 percent coal, but 40 percent "seems to be the best all-around figure." It is asserted that the coal will stay in suspension indefinitely without further treatment.

Another method, using circulation to keep the coal in suspension, has been tried at the Pittsburgh refinery of the Gulf Oil Corp., *Power Reports*. "A discussion of the test results by Alfred Butcher, steam engineer, appears in *Mechanical Engineering* of April, 1943." The Bethlehem Steel Co. also is conducting experiments and an installation has been reported at the Eastern Corp., Bangor, Maine, the fuel going directly from the mixing container to the boilers.

Cost Is Big Question

Biggest single question mark seems to be that of cost. The cost of the raw materials going into a barrel of colloidal fuel is somewhat less than that of a barrel of No. 6 oil and the colloidal fuel has a slightly higher heat content. "Out of this margin," *Power* points out, "must come the cost of grinding the coal and preparing the mixture, as well as fixed charges on the plant required. Reliable information on the cost of grinding may be expected soon and, since this represents the major operating cost, availability of test data will permit sound estimates to be made."

PAW puts the cost of an installation with a capacity of 300 tons per day (120 tons of coal and 1,065 bbl. of oil) at \$125,000. Production would be 1,779 bbl. of colloidal fuel per day. Estimated cost of the colloidal fuel is placed at \$1.57½ per barrel compared with a posted price (at that time) of \$1.65 per barrel for No. 6 fuel oil. On this basis, PAW has announced that it would not be necessary to subsidize any of the plants it suggests should be built (*Coal Age*, June 1943, p. 124).



Annual oil savings possibilities through conversions to coal in PAW Districts 1 and 2 actually made and in process. Even if conversion goal is met, oil supplies must be rationed. Colloidal fuel offers a possible means of stretching those rationed supplies, aiding plants that cannot convert to coal.

COLLOIDAL FUEL

Tests Show Possibilities as Oil Substitute

Colloidal-Fuel Substitution Has Possibilities of Saving About One-Third the Oil—Tests at Atlantic Refining Co. Plant Show That Mixing and Burning the Fuel Offers No Undue Problems

By J. F. BARKLEY
L. F. BURDICK
and A. B. HERSBERGER*

THE SHORTAGE of fuel oil caused by the war is forcing many oil-burning boiler plants to use coal. The cost of installing coal-burning equipment frequently is quite high. Operators of a number of such plants are giving much consideration to the emergency use in present equipment of mixtures of pulverized coal and fuel oil, popularly termed "colloidal fuel," a substitution that would save about one-third the oil. Involved in this decision are questions as to operating problems, procurement of the fuel and costs.

To the oil-burning operator, used to the relative ease of handling and burning fuel oil, adding pulverized coal to oil is something of the nature of adding a contaminant. New operating problems, to be solved by prop-

erly organized operating routine, arise from the changed characteristics of the fuel. Colloidal fuel is about 10 percent heavier in weight per unit volume than oil; it is about 7 or 8 times as viscous; it requires more power for pumping and pump capacities are decreased; it is much more abrasive; if the coal does not stay in suspension, pastelike accumulations occur in various parts of the equipment such as tanks, heaters, and valves; the ash from the coal in the mixture is set free in the furnace.

To obtain information on the operating problems involved, the Bureau of Mines, in cooperation with the Atlantic Refining Co., ran about a month's operating test on a colloidal fuel at one of Atlantic Refining's boiler plants at Philadelphia, Pa. The test was run as part of the regular plant steam production with the usual company operators. The fuel used was a mixture of 40 percent pulverized bituminous coal and 60 percent No. 6 (Bunker C) fuel oil, no "fixateur," or stabilizer, being added. Previous research at the Atlantic Refining laboratories on stabilities of mixtures showed about 40 percent coal to be the optimum amount.

The coals used were high-volatile bituminous—about 37 percent volatile and 5 to 8 percent ash—with ash-softening temperatures ranging from about 2,300 to 2,700 deg. F. The oil had a viscosity of about 50 to 70 seconds Furol at 122 deg. F. The viscosity of the mixture was about 300 to 500 seconds Furol at this temperature. Three different batches of fuel were burned, the main difference being in the fineness of the grinding of the coal. Batches of coal were ground to pass about 88 percent, 95 percent and 99 percent through a U. S. standard 230-mesh screen (62 microns), which is considerably finer than that ordinarily used at pulverized coal-burning plants. The Atlantic Refining laboratory research indicated that the finer grinding would be necessary for a colloidal fuel that would be reasonably stable.

In general, it was found that mixing the coal and the oil required for the tests was less difficult than had been anticipated. A simple batch-mixing device, shown in Figs. 1 and 2, was used. The fuel oil required for the batch, about 7,000 gal., was put in the plant storage tank and then pumped from the tank suction line

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Mr. Barkley is chief, division of solid-fuels utilization for war, U. S. Bureau of Mines; Mr. Burdick is senior fuel engineer in the same division; Mr. Hersberger is connected with the research and development department, the Atlantic Refining Co., Philadelphia, Pa.



Fig. 1—Pulverized coal and oil mixing device, showing funnel for coal mounted on the suction line from tank to pump. Pump discharge line runs toward left over top of suction line.

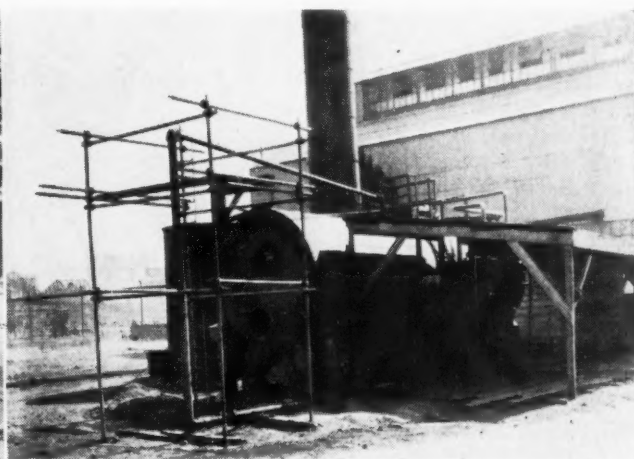


Fig. 2—Pulverized coal and oil mixing device, showing the two horizontal pipes of the discharge line, the two orifices, the vertical pipe and the horizontal pipe to the top of the tank.

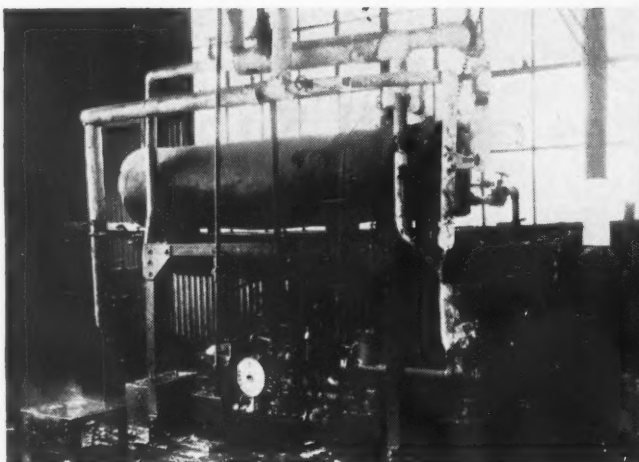


Fig. 3—Heater-pump set used in the tests at the Atlantic Refining Co. plant.

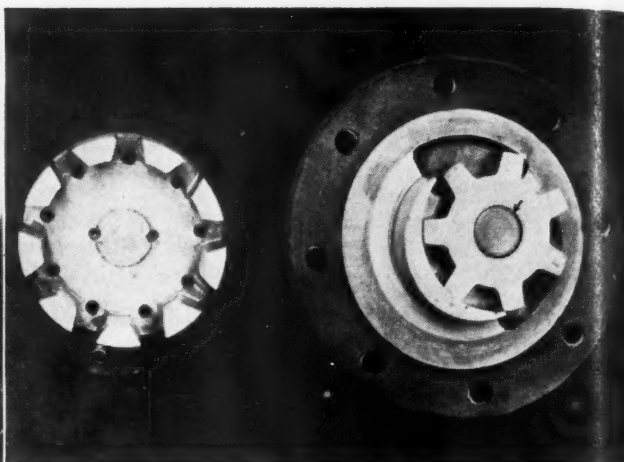


Fig. 4—Rotary-type oil pump from heater set. Erosion was mostly at the spindle.

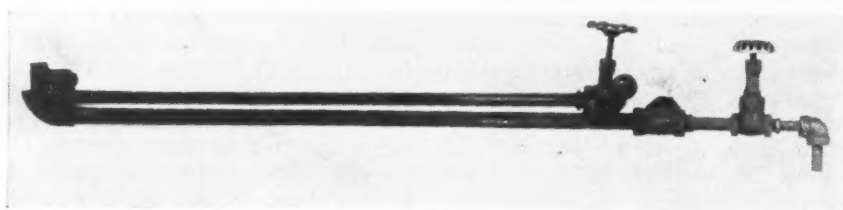


Fig. 5—Standard steam-atomizing burner used in the tests. Fuel reaches a horizontal slot at the burner tip through the lower pipe. The steam reaches a vertical slot through the upper pipe and sweeps the fuel into the furnace.

by an ordinary reciprocating pump. Its temperature was kept at about 85 deg. F. by steam coils in the tank. In the suction line, mounted on a tee and valve, was a funnel kept filled with pulverized coal.

The coal, under hand-valve control, was allowed to flow slowly into the stream of oil on its way to the pump. The mixture was discharged by the pump through two horizontal parallel pipes, each having an orifice near the end as shown in Fig. 2. The two streams of fuel met at the base of the vertical pipe and passed on to the storage tank. The fuel was spilled into the tank at two outlets, one at each end of the tank. The coal was fed into the oil at the rate of about 1,500 lb. per hour, the fuel being continually circulated at the rate of about 9,000 g.p.h. After the required quantity of coal was fed for the batch, the fuel was circulated for about 12 hours. Laboratory tests of samples of fuel taken at various places throughout the tank showed the mixture to be uniform. No further recirculating of the fuel was done during the burning tests at the boiler plant, the mixing device being valved off from the suction line.

The boiler-plant equipment was typical of that of many oil-burning plants. The suction line from the outside oil storage tank ran underground

about 100 ft. to the heater-pump set. A steam line that helped maintain fuel temperatures to the pump paralleled the oil suction line. Fig. 3 shows the heater-pump set. One pump was reciprocating and one was rotary. Fig. 4 shows the rotary unit. The fuel was heated to about 160 to 180 deg. F. at the set and pumped about 110 ft. to the boiler. The burner used was a standard Best steam atomizing unit, shown in Fig. 5. The fuel reaches a horizontal slot at the burner tip through the lower pipe; the steam reaches a vertical slot through the upper pipe and sweeps the fuel into the furnace. The fuel and steam were under hand control.

The boiler was a 151-hp. long-drum straight water-tube B. & W. unit eight tubes wide and nine tubes high. Fig. 6 shows the boiler front. The furnace was a typical brick-set furnace 10 ft. high at the front from the floor to the tubes and 6 ft. high at the rear. The furnace width was 5 ft. and its length 15 ft., providing about 600 cu.ft. of furnace volume. The burner entered the furnace at the rear under a horizontal baffle extending about half way the length of the tubes resting on the first row. The gases crossed through the tubes upward at the front of the boiler, then followed the usual vertical baffling, crossing the tubes twice more to reach the damper

outlet at the top of the tubes at the rear.

The boiler was first operated on oil to establish normal operating characteristics. It was then operated continuously on colloidal fuel. Ratings from about 40 to over 200 percent were carried without difficulty, but for a considerable part of the test the boiler was operated at about 100 percent rating. At this rating, it was found that the suction at the oil pump dropped from about 1.5 lb. per square inch pressure for oil to 4-in. vacuum for colloidal fuel. The pressure at the oil control valve was maintained for both fuels at about 30 lb. per square inch. At the burner, the pressure for oil was practically zero. For colloidal fuel, it was about 2 lb. per square inch. The steam consumption increased about 70 percent. The load on the pump increased. Under one set of operating conditions this load was about doubled. When colloidal fuel is being considered in present plant equipment, thorough attention should be given the problems of increased suctions, pressures and loadings on pumps. Pump capacities may be lowered.

Colloidal fuel has considerable abrasiveness. It acts something like a lapping powder. It is doubtful, however, if this characteristic would necessarily be a serious handicap to successful operation. Equipment affected should be watched and repaired as found necessary. There was wear on the pump shown in Fig. 4, most of it at the spindle. No repairing, however, was found necessary during the run. There also was some cutting at the burner tip.

When colloidal fuel is being considered, the question always arises as to the possible settling out of the coal from the mixture. This depends on

many factors, such as fineness of the grinding of the coal, type of oil, temperatures involved, and agitation or movement given the fuel. Undoubtedly the finer the coal is ground the better it will remain in suspension. As a practical matter, however, it is desirable not to grind the coal any finer than necessary. Where most settling is likely to occur is in the heater. At this point, parts of the fuel are heated much higher than the average temperature of the fuel leaving the heater. The higher the temperature, the more the settling to be expected.

In general, it is best not to have the fuel any hotter than necessary at any point in the system up to the furnace. Operating routine can be arranged to clean the heater as found necessary. If there are two heaters, they may be used alternately. On the tests at the Atlantic Refining plant, it was found unnecessary to clean the heater on any of the runs that lasted about seven days each. There was appreciable accumulation, however, in the heater when the 88-percent and the 95-percent coal through 230 mesh were used. There was practically none when the 99-percent coal was used. Some settling in the tank occurred with the 88-percent coal but none with the 95- and 99-percent as long as the storage tank was kept around 85 deg. F. No settling or clogging was experienced in the lines, although they were relatively long. There was some clogging in the meters and screens. Occasionally, throughout the day, the oil control valve tended to clog, but it could be readily cleared by opening it wide quickly. None of these difficulties were of moment. No boiler shutdowns occurred from operating troubles.

No difficulties arose in burning the fuel in the furnace with the steam-atomizing type of burner. The flame responded smoothly to changes of boiler load and to variations of the quantity of air used for combustion. It could be controlled with ease equal to fuel oil. The CO_2 content of the products of combustion could be carried as chosen up to about 16 percent with no CO . Burning colloidal fuel after it is in the furnace does not present much of a problem. Experiments are now under way on the rotary cup-type of burner, which has shown good combustion.

Troubles from the ash of the coal in the furnace were less than had been anticipated. The use of pulverized coal has supplied a vast amount of information on the action of ash in boiler furnaces and passes. It is not desirable to reexplore this field to any

great extent in connection with an emergency fuel. If a plant operator wishes to estimate about how much trouble he might have from ash, what those troubles are, and how they can be met, he might visit a few pulverized-coal-burning plants that are similar to his plant and operating with similar coal at about the same loads. In general he should expect much less ash troubles. Fig. 7 is a view of the furnace with the ash accumulation after about one week's operation. There was no dripping or slagging. The fly ash on the tubes was cleaned

without difficulty every 8 hours during the test by the boiler soot blowers.

About the same boiler efficiencies were obtained with both oil and colloidal fuel.

At present there is no commercial source of colloidal fuel. Various concerns are considering its production. Larger users could consider setting up their own grinding and mixing plants. This is now being done by at least one oil user. Studies are now being undertaken by the Bureau of Mines and the Atlantic Refining Co. to arrive at a low-cost mixing device. There is now on the market standard pulverizing equipment that will grind coal to the fineness of that used on the tests.

The question of costs is rather involved. How much can be afforded for the emergency fuel is an individual matter. The cost of equipment for complete conversion to coal may be very high. Under normal conditions in the past, the use of colloidal fuel has never proved itself to be an attractive proposition. Most oil-burning plants are in areas where, under normal conditions, it has been economical to burn oil. Colloidal fuel will cost more if the cost of handling, pulverizing and mixing of the coal results in a coal B.t.u. cost higher than the oil B.t.u. cost. If needed equipment is obtainable, the Atlantic Refining Co. estimates that on a production scale of 1,000,000 bbl. of colloidal fuel per year, this fuel could be sold in its area at about the same cost per million B.t.u. as that of the 16-gravity fuel oil now being delivered.

Inquiries regarding the tests should be addressed to the Bureau of Mines, Washington, D. C.

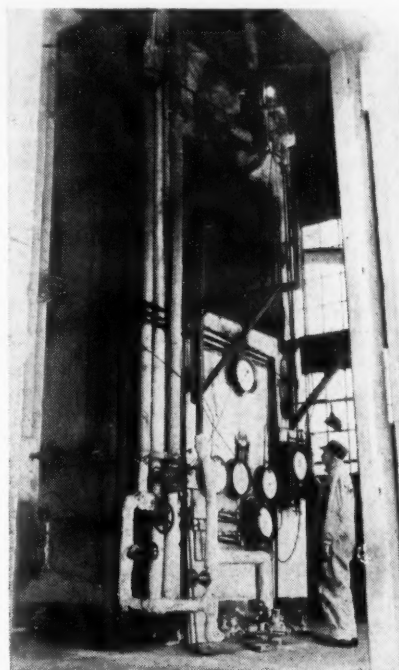


Fig. 6—Front of the 151-hp. long-drum straight water-tube boiler.

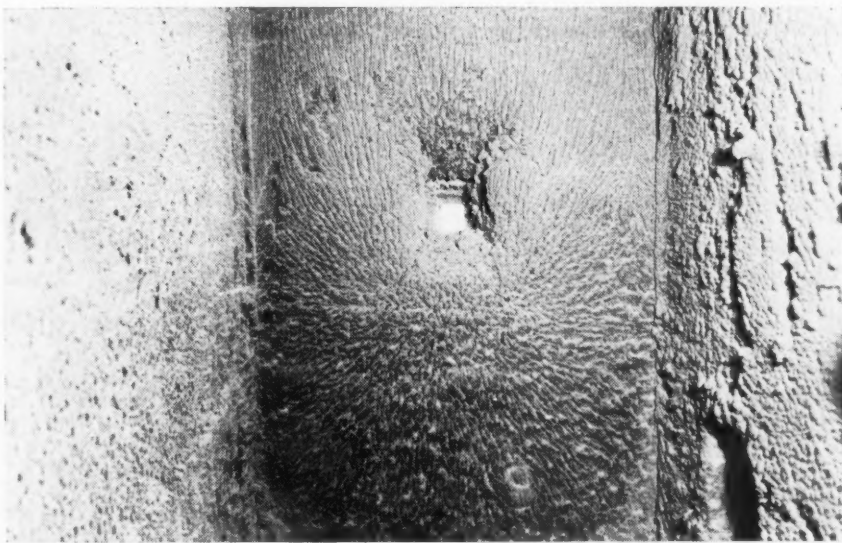


Fig. 7—Interior of the boiler furnace showing ash accumulation after about one week's operation.

1943 Coal-Mine WAR CONFERENCE

AMERICAN MINING CONGRESS

JULY 19-20

Netherland Plaza Hotel, Cincinnati, Ohio

Open discussion will follow each paper. All present are invited to participate, ask questions, present problems encountered and cite improvements at their own properties so that the industry may have a comprehensive picture of how these vital mining problems are being solved.

10 A. M. MONDAY, JULY 19

The Manpower Problem in Coal Mining

War Manpower Commission representative and operator spokesmen from various coal fields

12:30 P. M.—LUNCHEON

The Military Situation

2:30 P. M.—DEEP-MINING SESSION

Reducing Delays in Machine Operation—Equipment Maintenance
A. K. Hert, general manager, Snow Hill Coal Corp., Terre Haute, Ind.

Organizing for Increased Production

J. M. Johnston, vice president, Bell & Zoller Coal & Mining Co., Zeigler, Ill.

Conservation of Labor

C. C. Hagenbuch, chief mining engineer, Hanna Coal Co., St. Clairsville, Ohio

Frank G. Smith, general superintendent, Sunday Creek Coal Co., Nelsonville, Ohio

2:30 P. M.—STRIP-MINING SESSION

Strip-Mine Haulage

C. W. Woosley, general superintendent, Pyramid Coal Corp., Pinckneyville, Ill.

Maintenance and Repair in War Time

W. B. Pratt, treasurer, Dakota Collieries Co., Minneapolis, Minn.

Electrical Controls on Late-Model Shovels

Lester E. Briscoe, electrical engineer, Ayrshire-Patoka Collieries Corp., Oakland City, Ind.

9:30 A. M. TUESDAY, JULY 20

Quality Coal for War and Post-War Markets

E. R. Keeler, president, Franklin County Coal Corp., Chicago

Public Relations for Coal Mining

Edward H. Walker, director of public relations, Anthracite Industries, Inc., New York City



George F. Campbell, Old Ben Coal Corp., general chairman, program committee

Conservation of Materials

Joseph Pursglove Jr., president, Cornell Coke Co., Morgantown, W. Va.

SPECIAL PURCHASING AGENTS' ROUND TABLE

Conference with A. S. Knoizen, director, Mining Equipment Division, WPB.

12:30 P. M.—LUNCHEON

Assisting the Mines to Maintain Full Production

Howard I. Young, director, Mineral Resources Coordinating Division, WPB.

Coal for War

T. J. Thomas, Associate Deputy Solid Fuels Coordinator

Machinery and Equipment for Coal Mining

A. S. Knoizen, director, Mining Equipment Division, WPB.

2:30 P. M.—MANUFACTURERS' MEETING

Joint conference, manufacturers and Mining Equipment Division, WPB

2:30 P. M.—DEEP-MINING SESSION

Removing Seam Impurities Underground

John J. Snure, assistant production manager, Rochester & Pittsburgh Coal Co., Indiana, Pa.

Safety in War-Time Mining

E. R. Price, general superintendent, Inland Steel Co., Wheelwright, Ky.

Coal-Dust Control Underground

R. H. Honaker, safety director, Guyan Eagle Coal Co., Amherstdale, W. Va.

2:30 P. M.—STRIP-MINING SESSION

Moving Overburden With Small Draglines

Harrison Eiteljorg, general manager, Morgan Coal Co., Indianapolis, Ind.

Moving Overburden With Large Draglines

T. H. Latimer, engineer, United Electric Coal Cos., Chicago, Ill.

TUESDAY EVENING—ANNUAL DINNER

Guest speaker, Frank Knox, Secretary of the Navy

FACILITIES CONSOLIDATED

To Maintain Output When Mine Works Out

Consolidated Equipment Maintains Production With Only One Operation—Pit Tipple Prepares Clean Coal, Enabling Washery to Take Care of Remainder—New Diesel-Electric Locomotive Does Hauling

WORKING out the St. David mine in Illinois was no excuse for losing coal production in the eyes of the Truax-Traer Coal Co. management. Fiatt mine, nearby, absorbed the stripping, loading and transportation equipment and the personnel. It made the necessary changes in the pit and in the transportation set-up to handle the doubled tonnage. These included provisions for separating clean and dirty coal at the loading point, sizing the clean coal in a new wooden tipple built down in a cut and sending only dirty coal to the washery.

Stripping and loading equipment comprise the following:

- 1 950-B Bucyrus-Erie stripper, 30-cu.yd. dipper,
- 1 750-B stripper, 17-cu.yd. dipper,
- 1 375 dragline, 10-cu.yd. bucket,
- 1 100-B loader, 7½-cu.yd. dipper,
- 1 75-B loader, 5-cu.yd. dipper.

These, together with bulldozers for cleaning the coal surface and tractors for moving pumps and supplies and general utility work, make up the caterpillar-mounted equipment. In addition there are the necessary pit pumps, Sullivan air-operated coal drills and trucks for gathering service.

This equipment strips, loads and hauls to the tipple approximately 7,000 tons of raw coal per day, equivalent to 6,000 tons of prepared coal. The overburden averages 40 to 45 ft. and is stripped without shooting. The Illinois No. 5 vein is recovered. It averages 54 in. in thickness and must be broken up for loading. The mine loads coal six days a week.

Coal is loaded in the pit into Euclid 6-wheel 20-ton drop-door trailer trucks equipped with 150-hp. diesel engines, 16 of which are used at this mine. The runner on the loading shovel indicates to each truck driver whether the coal is "clean" or "dirty," an added responsibility which is the secret of increased tonnage without adding to the washing plant.

The wooden tipple, built down in an old stripping cut, together with a double bin for receiving coal from the trucks, serves a dual purpose. First, it is a transfer station for all the coal hauled by rail to the washery. Second, it is a preparation plant for the clean portion* of the pit production. The double bin is necessary to separate the two classes of coal. The two bins are end-on, each holding about 150 tons. A parallel double runway over the two bins provides for filling them to capacity. Feeders at the bottoms of the bins convey coal from one to a crusher and from the other to a picking table.

In the case of dirty coal, a 36x72-in. double-roll McNally-Pittsburg crusher reduces it to minus 6 in., or to the top dimension desired at the washer. From the crusher, a steel apron conveyor with high sides delivers it to 16-ton 36-in.-gage drop-bottom cars. An apron extension on the end of the conveyor trims the cars to a good height without coal rolling off. This trimming is done by pushbutton control from the tipple. The operator starts and stops the conveyor, regulates its height and can vary or stop

the supply of coal. He also signals by red and green lights when the locomotive driver is to move or hold the train while loading. The conveyor is stopped for car change and while an empty trip is being set on the loading track. Unless unforeseen delays occur, an empty train is waiting to take the place of a loaded train when it leaves.

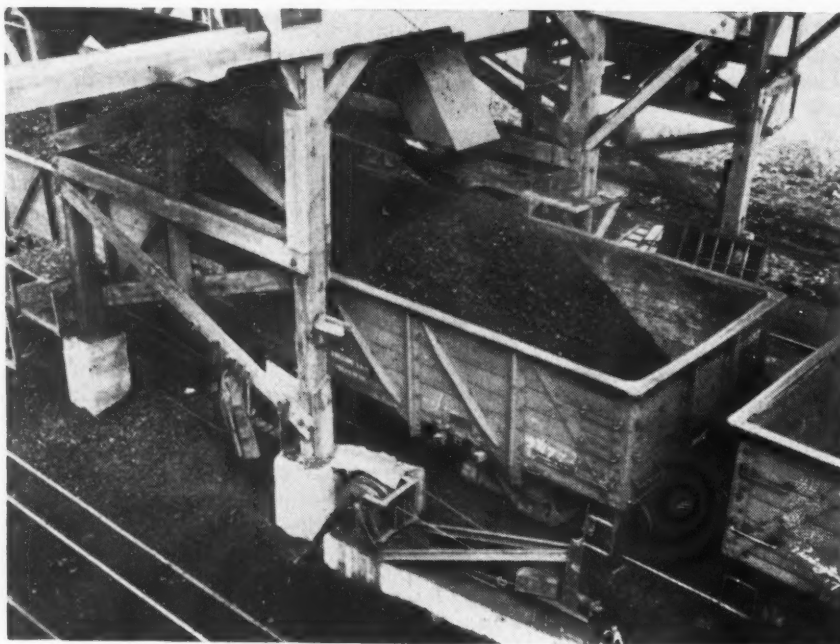
From the clean coal bin, coal is delivered by feeder to a McNally-Pittsburg combination shaking screen and picking table 6 ft. wide. The upper end has 3-in. round perforations, the screenings going directly to the tipple conveyor. Below the screen is the picking section. At the lower end of this section is a large square hole in the center, with the table widened on each side. Two bars span the hole so that large lumps may ride over it. As the stream of coal flows down the table, four men shift the clean coal to the center, where it will fall through the hole and the dirty coal to either side, where it will bypass the hole and go on into the crusher handling coal for the washer. Coal that drops through the hole in the table passes into a second 36-in. Jef-



Double driveway over raw-coal bins permits separating clean and dirty products for further handling.



Clean coal drops through the hole in the center of the picking table. Dirty coal is shunted around.



Twin chute permits changing cars without stopping coal flow. Each standard-gage track has a car retarder.

frey single-roll crusher, where it is reduced to the top size desired. It then joins the screenings in the flight conveyor that takes it all to the top of the tippie.

In this manner, four men hand-pick 1,500 to 2,000 tons of mine-run coal without actually picking up a lump except now and then. The effort exerted is merely that necessary to slide the coal to the center or outside of the table. A mercury vapor lamp over the picking table helps in distinguishing the impurities.

The tippie includes a Robins double-deck vibrating screen, the larger mesh being 1½ in., and a crusher in which the oversize may be reduced when required. Normally, it is split

into two sizes to fit the market. The crusher permits converting the entire tippie output into screenings or stoker coal.

The larger size shipped from the tippie is loaded over an apron boom, which also serves as a picking table for refuse that appears after crushing. The small coal is loaded through a split chute that permits making car changes without stopping the flow of coal. All tippie-prepared coal is loaded into standard railroad cars ready for shipment.

The tippie is a wartime structure from more than one viewpoint. Strip mines are not required by Illinois law to build steel structures. Such steel as was used in this plant came mainly

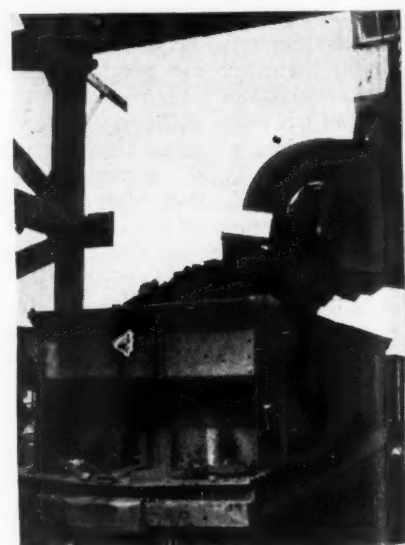
from dismantled structures; the timber from a local sawmill. The picking table and two large crushers are built on the ground, have concrete foundations and need little supporting material. There is practically no vibration.

The tippie spans four tracks, only two of which are used for loading prepared dry coal. The others are employed in loading coal for the washery and switching the empties. The tippie equipment required little space. The entire structure is small. At first glance, the only things that seem commensurate with the volume of coal handled are the feeders, crushers and conveyors.

Power for the tippie is taken from a bank of three 150-kva. Moloney transformers. A total of 440 hp. of 440-volt G. E. induction motors, ranging from 5 to 100 hp., are used to drive the equipment. The loading boom and the conveyor loading washery coal are equipped with Shepard boom hoists. Lighting is from small 440/110-volt dry-type transformers cut into the 440-volt circuits at points where lights are needed. This saves running lighting circuits all over the tippie.

To handle the larger volume of coal, transportation to the washer and railway connection was revised. Coal to the washery is hauled by six 20-ton Plymouth gasoline locomotives, one a standby, and 35 16-ton drop-bottom roller-bearing cars over a 36-in.-gage track from the pit tippie. This rolling stock is made up into five 7-car trains, so scheduled that an empty trip is at the tippie when the loaded trip is ready to leave.

To bring railroad cars to the new



Apron on end of conveyor loading coal for the washer trims 16-ton cars without spillage.

tipple location, a distance of three miles, required standard-gage track and a heavier locomotive. The first was provided by adding a third rail to the narrow-gage road. This was laid on the original ties.

The motive-power problem has been solved by the purchase of a new General Electric 65-ton diesel-electric switching locomotive. Specifications include the following:

Weight loaded, 131,100 lb.

Tractive effort (30 per cent), 39,000 lb.

Maximum speed, miles per hour, 40.

Maximum curve radius, 75 ft.

Engines, two Cummins HBIS-600, 200 hp. each.

Generators, two G. E. direct connected.

Motors, four G. E., Type HM-838.

At 5 m.p.h. will haul 400 tons up 1 percent grade with rolling friction of 20 lb. per ton.

Serves Two Purposes

The locomotive is used for two purposes: first, as a pusher behind the outgoing washery trips up a section of stiff grade during the hours of coal loading; second, switching railway cars. At the noon hour it transfers empties and loads into and out of the tipple yards, which do not have the capacity for a full day's run of around 35 or 40 cars.

On the afternoon shift, when no coal is being run, the big locomotive delivers all loaded coal to the railway connection and spots empties in the mine storage and tipple yards. Thus, empty railway cars are in the tipple yard ready for the next day. A 35-ton Plymouth locomotive spots cars under the tipple for loading and pinch-hits for the G. E. on occasion.

The new locomotive has standard automatic railway couplers and air brakes, push pockets, storage-battery engine-starting gear and a totally inclosed center cab with hot-water fan heat. Two Cummins supercharged diesel engines are direct connected to G. E. d.c. generators. An HM-838 traction motor is installed on each of the four truck axles. The total weight of the locomotive is available for tractive effort. A removable offset push plate is bolted to one coupler so that it is not necessary for the couplers of the two types to line up for the new locomotive to serve as a pusher.

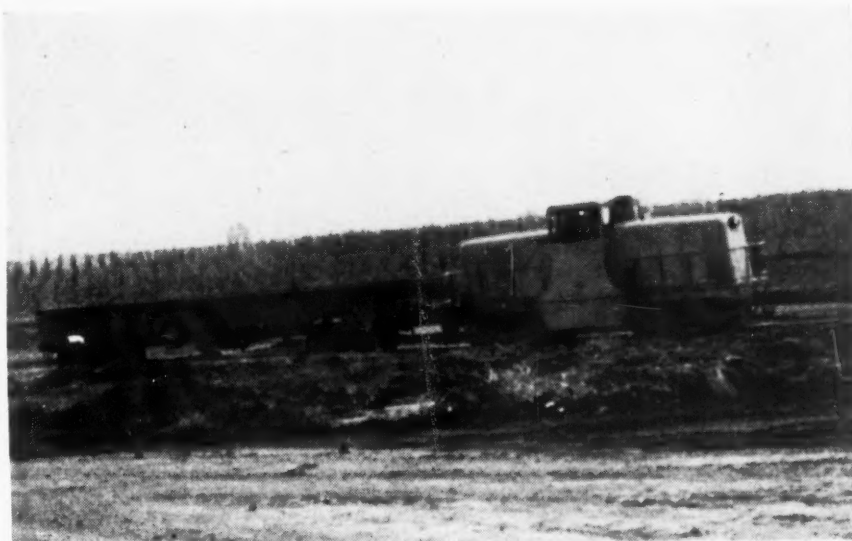
The Truax-Traer men responsible for this wartime development are: T. G. Gerow, vice president; Byron Somers, superintendent; Jack Bullington, pit superintendent; Elmer Martin, chief electrician; and Roy Lesene, mechanical superintendent.



A narrow-gage train is shown here almost loaded. Left is the combination picking table-loading boom for coarse coal on standard-gage track.



Loaded tipple tracks, part with three rails for both standard- and narrow-gage cars.



New diesel-electric locomotive for standard-gage cars.

TIMBER TREATMENT

Pays Out in Southern West Virginia

Trend to Treated Ties, Timber and Lumber Begins to Develop About 1935—Cost of Treated Product Higher But Longer Life Provides Substantial Savings in Replacement Cost—War Stimulates Use in Mines

MINING companies which started to install treated timber and ties four years or more ago are now cashing in for themselves and for the government. Their large returns are evident in comparison with the situation at mines where untreated ties and timbers have rotted and need replacement at this inopportune time. Treated timber is now in such heavy demand that treating plants are finding it difficult to secure the better and carefully chosen grades of timber usually selected for treatment. As a result, many operators interested in installing treated material are unable to get supplies. Untreated timber of quality is equally hard to obtain while the labor to replace rotted timber, ties and structures is a sad story.

A recent survey in several counties of southern West Virginia, where timber had been plentiful for years and operators had been slow to go to the use of treated ties and mine roof supports, reveals that 1935 marked the beginning of a definite trend to treated wood. By 1941 many operators were

installing treated ties in new developments and as replacements on existing haulways. This survey included fifteen mines in Logan, Boone, Kanawha, Raleigh and Fayette counties.

Pioneering in Kanawha County, the Carbon Fuel Co. installed in 1929 a complete vacuum-pressure-type wood-treating plant with a 54-in. x 21-ft. retort for treating ties, props and miscellaneous lumber using Wolman salts (Coal Age, June, 1930, p. 343; May, 1933, p. 161). In 1935, the plant was sold to the Griffith Lumber Co., which has since organized the Appalachian Wood Preserving Co., Huntington, W. Va., to handle the timber-treating business. The new owner moved the plant to Sanderson, on the Elk River 22 miles from Charleston, replaced the original retort, or tank, with one 44 ft. long, adopted du Pont chromated zinc chloride ("CZC") and agreed to furnish the Carbon Fuel Co. with wood thus treated. Following a policy of keeping the plant close to the timber supply, that corporation has again moved it, this time to Wayland, Ky.

The Christian Colliery Co., at Mahan (Fayette County), used creosoted ties in 1933 in rebuilding a two-mile underground main haulage road when the original lightweight rails were replaced by 85-lb. Those ties, although treated only by painting, are still in service. This company, now operating three mines, has continued a policy of using nothing but treated ties for all haulage except in rooms. In room service, steel ties are standard. The wooden ties are being creosoted at the mine by dipping followed by tight piling in storage to confine the drip and give time for absorption and penetration.

The Milburn By-Products Coal Co., a few miles up Paint Creek from Mahan, started to install 7x9-in. x 14-ft. "CZC"-treated ties on its monitor incline in 1940. This incline is 1,650 ft. long. The work could be done only when the monitors were idle, and so extended over until October, 1941, during which time 503 ties were installed. The cost of these hardwood ties (no gum included), pressure-treated with $\frac{3}{4}$ lb. of chromated zinc chloride per cubic foot, was \$3.30 each delivered at the mine. A brief report from the mine management includes the following: "We do know that rot has been stopped and there will be no further replacements for years to come."

The New River Co., also in Fayette County, started using 5x7-in. x 54-ft. creosoted ties, purchased from the Wood Preserving Division of the Koppers Co., Pittsburgh, and the Tri-State Creosoting & Terminal Corp., Kenova, W. Va., in 1933. In 1939, New River switched to "CZC"-treated ties, part purchased from the Griffith Lumber Co. (Appalachian Wood Preserving Corp.) and the remainder from the Wood Preserving Division of Koppers. New River now has treated ties on the main lines in the following mines: Lochgelly, Summerlee, Oakwood, Cranberry and Skelton. Recently, in the two mines last mentioned, some 4x6-in. "CZC"-



At this new mine, opened four years ago by the Youghiogheny & Ohio Coal Co., all the mine ties are treated. Although some of the section ties have been moved to their third location, no ties have been lost to date through deterioration.

treated ties have been installed instead of the former standard 5x7-in. size.

The years 1940 and 1941 saw the introduction of Osmose-treated ties and lumber at several mines in the counties covered in the survey. Now that the supply of commercially treated ties is far below the demand, at least two mines are preparing to cut their own timber and treat it green, using Osmosalts furnished by the Osmose Wood Preserving Co. of America, Inc.

Several of the mine operators using "CZC"-treated ties reported themselves favoring their use over creosoted because the former are odorless, clean to handle and measurably fire-resistant. It is understood that in this chromated zinc-chloride development of du Pont's Grasselli Chemicals Division, the chromium acts as a mordant to fix the zinc chloride to the wood fibers, thus preventing leaching out in the presence of moisture or water. The efficiency of the zinc chloride itself in preventing decay of wood is long established by service records.

The Appalachian Wood Preserving Corp., which uses "CZC" exclusively, treats only the "hard woods." By that designation the corporation means all of the trees which, in the tri-state area, lose their leaves in the winter. However, oak, beech and hickory constitute the bulk treated. As with any other treatment there is difficulty in getting penetration into white oak. Therefore the more porous red oak, when treated, usually will resist rot better than its harder brother. The outer or sap wood of the beech is impregnated readily and lasts well. The red heart of that tree has the characteristics of white oak.

Costs of commercially treated ties delivered to the mines are double or less those of the locally cut and untreated variety. In any comparison, account should be taken of the fact that usually the commercially treated ties were more carefully selected and were worth considerably more before treatment than the average of untreated ties furnished to mines. Coal operators generally are aware that untreated ties last scarcely 2 to 5 years and expect 10 to 20 years from the treated.

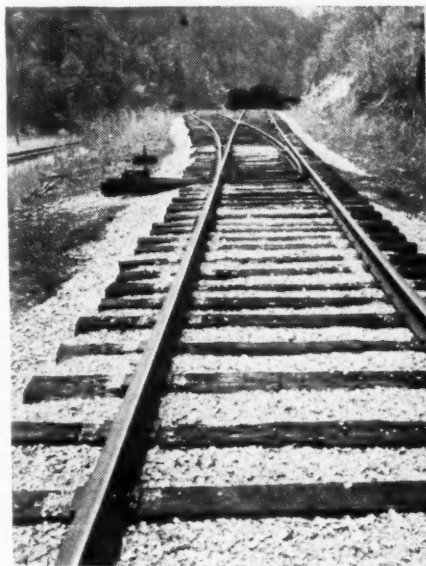
In Logan County, the Norfolk & Chesapeake Coal Co. began to install treated ties when developing a new mine in the Chilton seam in 1941. Greater scarcity of wood and the mounting costs for replacement labor were the reasons for going to treated ties for this new opening, which the company expects will have a life of 20 years. "CZC"-treated ties were installed on a 900-ft. incline and that same type, together with about an



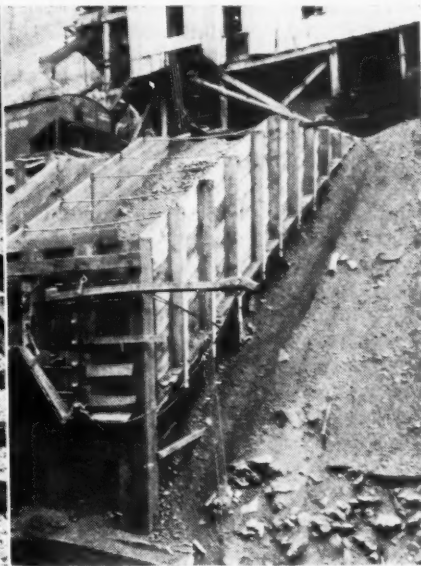
Projected life of the new mine of the Norfolk & Chesapeake Coal Co. is 20 years, so there should be little tie trouble on this 2,600-ft. tramroad on treated ties.



Crushed-rock ballast, 4x6-in. x 6-ft. treated ties and 60-lb. rails feature main line in Van mine, Youghiogheny & Ohio Coal Co. This view shows empty track looking inby.



These empty tracks are owned by the Y. & O. and are on treated ties.



House coal bin (50 tons capacity) of treated lumber, Anchor Coal Co.

equal number Osmose-treated, were put in a 2,600-ft. tramroad.

The Guyan Eagle Coal Co., also in Logan County, installed 2,000 Osmose-treated 5x7-in. x 6-ft. ties three years ago, part of them underground and the others outside. Now, at a time when untreated ties would be showing signs of needing replacements, these treated ties promise to last many more years.

No losses of treated ties in the four years since the mine was opened, although many of the ties are in their third location, is the report from the Youghiogheny & Ohio Coal Co., at Van, Boone County. The batch of ties first installed and on which enough time has elapsed for their extra value

to begin to show up, are Koppers creosote-treated. For the last two years, new installations have been the "CZC"-treated.

In this mine, opened with a new tippie and equipment to replace the old mine—worked out—there are now 5½ miles of 44-in.-gage track with treated ties on 18-in. centers. Rail weights are 60-lb. on the mains and 30-lb. on the flats or cross entries. Of the present developed area about half has been worked out and the rails and treated ties have been moved to new locations. The second time a treated tie is installed it is turned over and the spikes are positioned on the opposite diagonal from the first installation. On the third installation, the



Left—In Cranberry mine of the New River Co. these 75-lb. rails on 40-in. gage rest on 4x6-in. x 5½-ft. treated ties. Five mines of the company now have main lines on treated ties. Right—Bridge renewed with treated wood in the town of the Anchor Coal Co.

ties are staggered—that is moved end-wise out of center, thus putting the rails and spikes at entirely new positions.

Little difference in service has been observed and the delivered costs of either treatment are about double the cost of untreated ties. At that differential operating men have not the slightest doubt but that the treated ties pay handsomely. The ties are red and white oaks, 4x6-in. x 6-ft. To hold main-line rails to gage on curves a steel tie is installed every 10 ft. One also is placed under each switch point. All main lines are ballasted with crushed rock hauled into the mine.

When the Glogora Coal Co., also in Boone County, opened the new Blue Pennant mine, at Red Dragon, in 1938 it installed locally dipped ties on the supply incline. Those ties are still in good condition, while untreated ties on an outside tramroad installed the same year are now requiring renewal.

A third Boone County producer, the Anchor Coal Co., has in use considerable treated wood in the form of ties and building lumber, some of it treated locally with Osmosalts and the remainder purchased already treated with "CZC." The Osmosalts were used in 1940 on 1,000 ties of beech and oak and on 1,000 board feet of brattice lumber. These have shown no signs of rotting. The next year, Anchor installed 978 "CZC"-treated ties on a 60-lb. main-line track in No. 3 mine. In 1941, also, the same chemical was used for complete replacement of the porch, walkway and steps at the Anchor operating office, for building a 50-ton house-coal bin at the tippie and for a bridge of a town street. Five years had been the maximum life of the office steps and walkway when built of the best grade untreated white oak.

A captive mine operating in that

county installed creosoted 4x6-in. x 5½-ft. ties on 6,000 ft. of main haulway three years ago when a change was made from 30-lb. to 56-lb. steel. Last winter a 5,000-ft. section of 55-lb. main line was laid with 5x7-in. x 5½-ft. ties treated with Osmosalts. Timbers (8x10-in.) now being installed for roof support on the main line are being brushed with the same chemical.

The Wyatt Coal Co., which operates three mines in Kanawha County, Laing Nos. 1, 2 and 3 and Wymar, started using treated ties in 1942. At No. 2 mine, Eskdale, "CZC"-treated ties (5x7-in. x 6-ft., mostly oak) were installed under 60-lb. rails on 5,000 ft. of outside road and 2,500 ft. of underground track. At Wymar mine, Sharon, 700 Osmose ties of the same size were installed on an outside tramroad. And for five years this company has been replacing rotted power and light poles with creosoted poles purchased from the Tri-State company.

Beginning in 1941 the Truax-Traer Coal Co., operating four mines in the vicinity of Kayford, Kanawha County, has purchased about 15 carloads of "CZC"-treated ties from the Griffith Lumber Co. and Appalachian Wood Preserving Corp. These ties, 4x6-in. x 6-ft. and oak only on the first orders, with considerable beech later, were installed on underground roads to replace rotted ties. From another source Truax-Traer, purchased 1,500 to 2,000 Osmose-treated ties.

Truax-Traer also operates the Marfork mine, in Raleigh County, and for that operation has purchased several carloads of 5x7-in. x 6-ft. creosoted ties from the Wood Preserving Division, Koppers. Those ties are installed in both inside and outside tracks.

The survey included inquiries at the operating offices of three other Raleigh County coal-mining companies. In 1940, 1¼ miles of 45-lb. track, "CZC"-

treated 5x6-in. x 6-ft. ties, was installed in the new No. 8 mine, Slab Fork Coal Co. The belt haulage slope at this new operation is protected by 6x10-in. headers and 3x10-in. lagging commercially treated with "CZC," using the hot-and-cold process. The tie and slope timbering woods include beech, gum and oak.

When the Gulf Smokeless Coal Co. opened a new mine, Tams No. 2, in the Pocahontas No. 4 seam in 1941 the first 2,000 ft. of 60-lb. main line was put on "CZC"-treated ties. The year 1940 marked the start on treated wood at the Princess Dorothy Coal Co., at Eunice, Raleigh County, using the Osmose process. Next, the coal company used "Rot Not" compound to paint 5x7-in. ties for 2,600 ft. of a 3-mile 70-lb. main-line tramroad to a new lease. On the supply incline at Eunice (30-lb. rail) about half of the original untreated ties have been replaced with "CZC"-treated 4x5-in. x 6-ft. ties. Poles installed for power and light lines are painted with "Rot Not."

Eight years ago, the Colcord Coal Co. installed at Montcoal a mile of main line with "CZC"-treated 6x8-in. x 5½-ft. ties. Since that time, the company has put 7x9-in. x 11-ft. ties treated by the same process on an incline, has bought ties with the same treatment for railroad tracks at a tippie and installed at Stickney 5 miles of treated mine tracks. Now, in view of the slow deliveries of commercially treated ties, normally preferred, that company is preparing to cut timber and treat the green wood locally with Osmosalts.

It should not be inferred that treated timber is being used only in the counties which have been mentioned. McDowell County was not covered in the survey but it is known that at least one large mining company operating therein began to use "CZC"-treated ties and timber prior to 1938.

SEMI-PORTABLE TIPPLE

Handles Large Coal Tonnage at Low Cost

Two Dump Bins Equipped With Variable-Speed Feeders Blend the Different Coals Received—Double-Shuttling Cross Conveyor Provides for Loading Open Cars, Box Cars or Trucks, as Necessary

TO SERVE the numerous railroad-shipping truck mines now being operated or opened in small acreages a need arose for the design of efficient, compact and semi-portable tipples. Outstanding in those features is the new 250-tons-per-hour Colwell plant of the Freebrook Corp., near Kittanning, Pa. In this plant, machinery of modern design provides controlled blending of input, picking, crushing, changing cars without stopping and box-car loading. The plant is built entirely of steel with the exception of underground dump bins, which are concrete, and is arranged so it can be cut into sections for moving and erecting at a new site.

The main office of the Freebrook Corp. is in Kittanning. Charles M. Shoffner is president and S. C. Maurice is general superintendent. The Colwell coal tippie, which is unique in some of the principles and practices for efficient and effective coal handling, was designed by the corporation's own engineering department.

The structure was built to one side of the loading track rather than spanning it and is fitted with a canopy or marquee sheltering the cross conveyor, loading chute and operator's platform. The capacity previously given, 250 tons per hour, is based on a 4-in.

crushed product. What the crusher can handle is the deciding factor and the capacity is reduced to 150 tons per hour when preparing minus 2-in. Plant arrangement includes also a provision for loading trucks.

Incoming coal, after being weighed on a Winslow 20-ton 8x18-ft. scale, is dumped at ground level into one of two concrete hopper-bottom pits each fitted with a reciprocating feeder which can be adjusted to any one of four rates, 100, 50, 25 or 20 tons per hour. By quickly made adjustments of sliding gates at the throat openings these rates can be increased 50 percent. Both feeders empty at the same point onto a Barber-Greene elevating conveyor, 36 in. x 129 ft. 6 in. center to center, 16-deg. pitch. Near the upper end of this conveyor the bony is picked out of the coal and dropped into chutes discharging to a truck-loading bin under the main structure.

From the elevating conveyor the coal slides over a 2-in. grizzly into a Jeffrey 30x30-in. single-roll crusher. The crushed and bypassed coals unite under the crusher and flow onto a 36-in. x 16-ft. center-to-center Barber-Greene cross belt which delivers to the car-loading chute. The cross belt has a double shuttle mounting.

It can be moved backward for loading closed-top railroad cars or can be moved to one side to permit the crushed coal to flow directly to the bin normally used for bony. From that bin this prepared crushed coal can be gravity-loaded into trucks. Provision for changing railroad cars without stopping the tippie consists of an inverted Y-chute with fly gate.

Variable speeds for the feeders are obtained by use of Ford V-8 transmissions which serve also as countershafts to provide the necessary speed reductions. Because the feeders are of the reciprocating type and their cranks can rotate in any direction, the "reverse" of the automobile transmission serves as one of the feeder speeds. Coals of different qualities or characteristics from the same mine or from different mines are blended by means of the two dumping pits and feeder adjustments.

All motors are Westinghouse Type CS Class 2 220-volt three-phase 60-cycle units with Westinghouse controls. They operate on purchased power and the starters are controlled from pushbuttons at convenient points. Concrete dump pits drain to a sump in which is installed a small sump pump with float control.

Bins, feeders, grizzly, double-shut-



Tippie from the dumping pit and conveyor side is shown at the left. On the car side appears the canopy over the loading track; opposite side, I-beam for handling equipment. Illustration at right shows incoming trucks moving across the scale while others are dumping in the pits.

ting arrangement for the conveyor and the plant structure are all from designs made by the corporation's engineers. Conveyors are standard designs also and include gear trains running in oil. All other machinery drive connections are V-belts. Feeder drive shaft and connecting-rod bearings are Link-Belt roller units.

The tippie structure is all steel, including floor plates, and is an all-welded assembly. The only combustibles in the plant are doors, door

frames, belts, conveyor walkaway and the rubber mat at the control panel. The whole structure was designed and planned so it can be cut into sections for moving to a new job and there be welded and/or bolted together. As if to prove that nothing was forgotten, an I-beam projects at the top on the side opposite the loading track. This beam serves as a track and cantilever support for handling the crusher or any other equipment or parts in and out of the structure.

Present loading by this Colwell tippie is 30 to 35 50-ton railroad cars per day. The maximum has been 48 cars, or approximately 2,650 tons. With 6x0-in. coal, railroad cars have been loaded at a rate of one in 10 minutes.

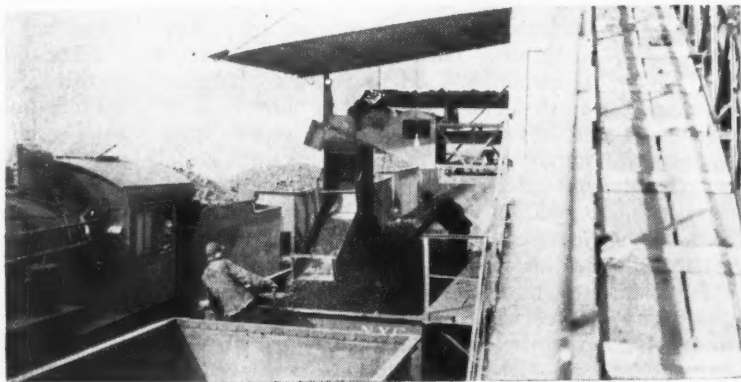
The plant was designed under guidance of John R. Shoffner, a registered professional engineer employed by a number of coal-mining companies, some of which he serves as chief engineer and others as consultant.



The structure, although all steel and welded, is designed to be cut into sections for moving. Bin and loading gate under the main structure normally handle bony. However, they can be used for truck loading.



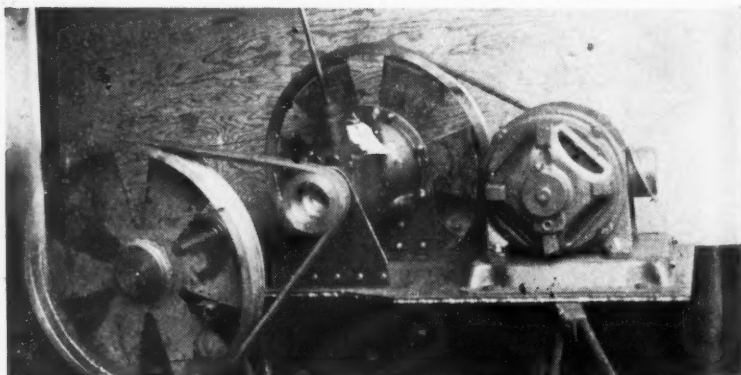
Coals of different grades are dumped into assigned pits and the feeders are adjusted for blending.



About to change a car. The trimmer is ready to flip the fly gate from one leg of the chute to the other so that the tippie need not stop.



Elevating conveyor and cross conveyor in the left background are standard designs.



Shop view of four-speed feeder drive unit, with automobile transmission also serving as a countershaft. Crankshaft and connecting rod have roller bearings.

POWER NEEDS MET

By Equipment for Using Exhaust Steam

Mixed-Pressure Turbine Salvages Heat Loss to Exhaust—Simple Steam Regenerator or Accumulator Smooths Out the Exhaust Impulses—Condensate Feed Water Reduces Maintenance on Boilers

NEEDING more power for its growing mechanical mining, the Dering Coal Co., Eldorado, Ill., took a look at the huge clouds of steam being exhausted into the air and the heat energy going to waste. Realizing that there was almost as much power in that steam as had been extracted, it has installed a used General Electric 1,250-kw. unity-power-factor mixed-pressure condensing turbo-generator to harness that waste and put it to digging coal.

A.c. power was necessary because workings were far from the shaft—too far for the transmission of d.c. current at 275 volts. A.c. is generated at 2,300 volts and transmitted approximately two miles to two underground motor-generator sets with capacities of 250 and 300 kw. The steam end of the machine is built for 16 and 165 lb. absolute pressure. Actual conditions are approximately 16 and 140 lb. absolute pressure or 1 and 125 lb. gage.

Before installation of the turbo-generator, the power set-up included the following equipment: one 225-hp. O'Brien and eight 150 hp. Frost horizontal-return-tubular boilers, 125 lb. pressure; one Vulcan Iron Works 26x42-in. double-cylinder reversing steam hoist; one 16x24-in. 200-r.p.m. and two 23x28-in. 175-r.p.m. 4-valve Chuse steam engines, direct-connected to 200- and 350-kw. 250/275-volt d.c. generators; one 16x16-in. Chuse slide-valve engine driving a Sullivan 8½-ft. ventilating fan at 200 r.p.m. All these engines operate non-condensing.

To supply the steam turbine, the exhaust of all power units except the fan engine was piped into a 16-in. header which leads through an oil separator to a steam regenerator, or accumulator. This regenerator is a horizontal cylindrical steel tank 26 ft. 5 in. long and 10 ft. in diameter. It has a 16-in. exhaust inlet and a 20-in. steam outlet to the turbine. It is

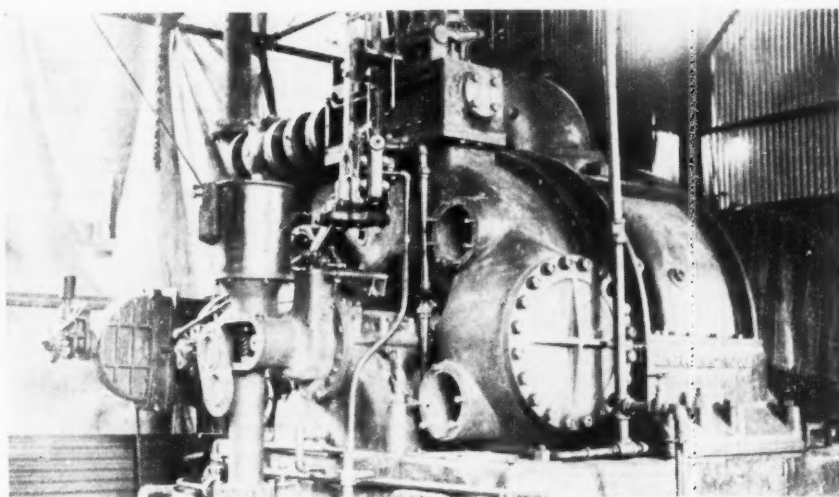
provided with means to control the water level and to force a circulation of the water inside the tank. Turbulent circulation is maintained by the fan engine exhaust, which is piped directly to the regenerator and through a sort of ejector within the regenerator. The water level is carried a little above the center of the tank.

The regenerator is a surge tank with a dual function: to serve as a reservoir for the exhaust steam and to absorb and give up the surplus exhaust steam. This latter action is controlled by the supply of exhaust steam compared to the turbine demand. When steam accumulates in the tank, the pressure rises slowly but its temperature rises very rapidly; therefore the cooler water condenses a large volume of this steam. When the process reverses and the pressure drops, due to the hoist stopping, the exhaust-steam temperature drops rapidly and a large volume of steam is evaporated from the water to supply the turbine. Rapid circulation of the water within the regenerator is necessary to bring cool water continually to the surface,

where it may contact and absorb all excess exhaust, which it gives up as soon as the supply of exhaust steam fails.

So that this give-and-take cycle of heat exchange will function, the temperature of the water must be near that of the exhaust steam. Before starting the turbine from a cold condition, the water in the regenerator must be warmed up. For this purpose, a 2-in. high-pressure steam line is inserted in the water-circulating ejector, entering the same tee connection with the fan engine exhaust. A 6-in. high-pressure steam line is run from the boilers to the high-pressure turbine valves to supply live steam when the exhaust supply drops to a point where it will not carry the turbine load.

There are times when the exhaust steam supply is in excess of the demand. An 18-in. Fisher relief valve, attached to the 20-in. steam line, is arranged to bypass excess steam to the condenser and save it for boiler water. If the regenerator pressure continues to build up, an atmospheric relief valve opens at 4 lb. pressure.



Mixed-pressure turbo-generator during installation.

Occasionally, the regenerator is drained directly into the pit in which it rests, which has a gravity drain to waste. This gets rid of the oil accumulations that may have passed the oil separator and also rids the tank of any accumulation of sludge.

Exhaust from the turbine is through a 42-in. pipe connection to a Prescott surface condenser. Circulating water is pumped directly from the nearby spray pond by a 4,000-g.p.m. DeLaval centrifugal motor-driven pump. There are two condensate pumps with 2-in. suctions which deliver the condensed water to the heater, from which it

is pumped to the boilers. One is a standby.

Power is transmitted 7,600 ft. over a 4/0 3-phase line to a junction. From this point a 2/0 line runs both ways to the two motor-generator sets. A leaded paper-insulated cable reaches from the surface down a 4-in. pipe grouted in a borehole. This pipe extends from the surface to within 15 ft. of the coal. The remaining distance is a smaller hole without pipe casing.

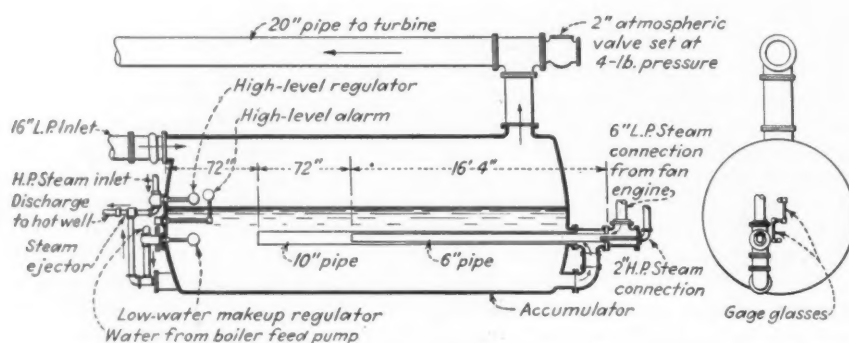
Besides taking over all of the mining load and most of the haulage load, this new power supply has reduced

boiler maintenance through the condensed feed-water supply.

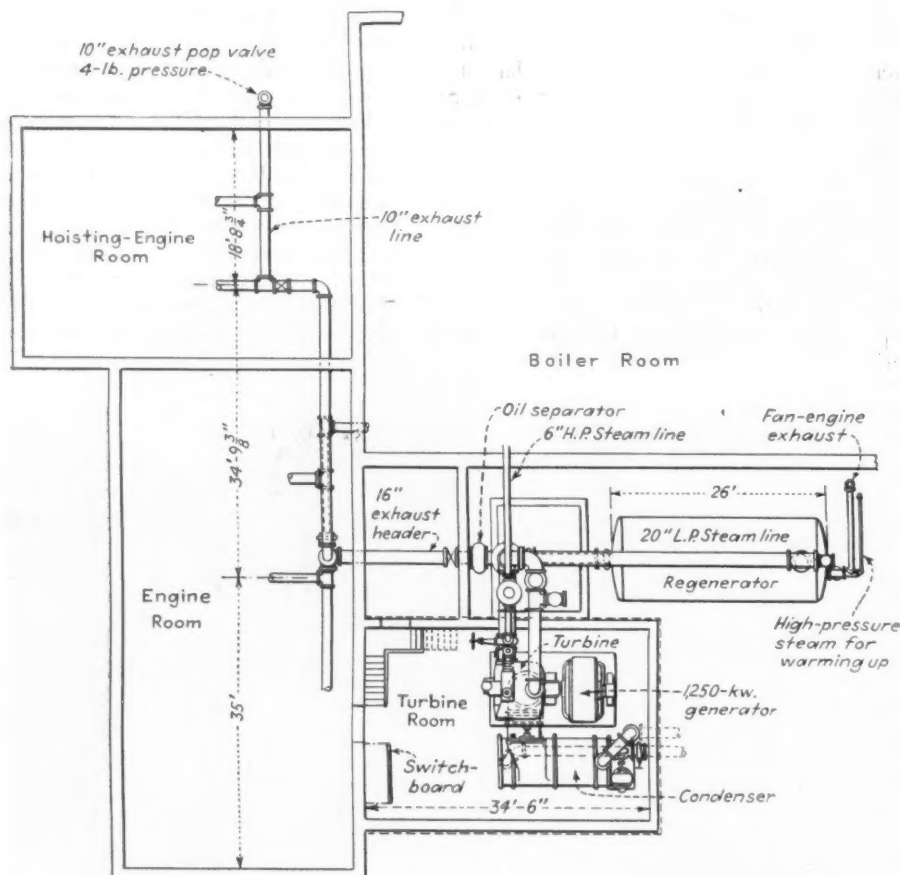
The installation of this equipment, most of which had seen use, brought about some interesting problems. The turbine dates back 30 years, so its condition was not perfect. The shaft was out of round where the carbon seals make contact. Vacuum could not be maintained. A small motor-driven grinding wheel was set up, the turbine rotated at about 200 r.p.m. with a motor drive and the rough portion ground true.

The condenser was entirely dismantled and the tubes were removed and cleaned inside and out. For this job, an improvised motor-driven rotating device was set up to spin the tube. Two workers cleaned and polished inside and out at the same time.

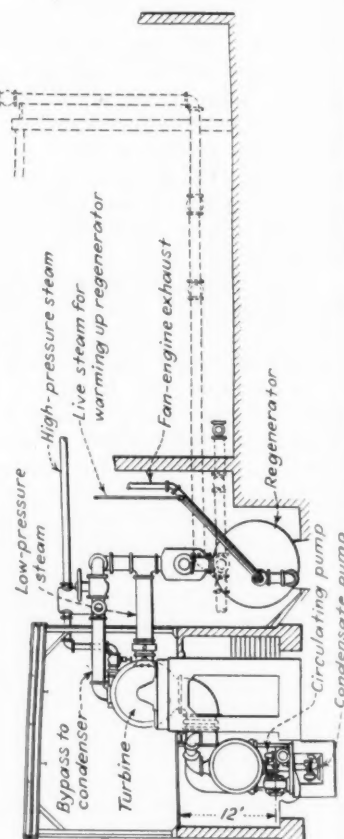
The regenerator was received in icy weather. The pit for it had been dug and the concrete floor and cradles laid, but the side walls were not concreted. The pit was full of water. The regenerator was skidded into the water in the pit, where it floated. Water was then pumped from the pit and the regenerator lowered and set on its foundation piers. Later, the walls of the pit were concreted.



This cross-section of the steam regenerator shows its simplicity.



General arrangement of the turbine, condenser, regenerator and piping is shown at the left. At the right is a vertical view of the turbine unit and auxiliaries.



MINE POWER

Old Principle Offers Wartime Benefits

Three-Wire D.C. Transmission Offers Possibilities of Raising Voltages With Large Savings in Copper—Safe Operation is No. Great Problem—Difficulties No More Than With Three-Wire A.C.

By **GEORGE C. BARNES JR.**

Senior Engineer
The West Virginia Engineering Co.
Williamson, W. Va.

PRODUCTION on a 6-day-week basis must be accompanied by all possible measures for keeping equipment in operation if coal mining is to meet wartime demands. Both these considerations focus attention on the power problem and especially on the maintenance of proper voltages at the motors on electrically operated equipment. Furthermore, proper voltages should be maintained with a minimum use of strategic materials, such as copper.

Coal mining is carried on largely with d.c. power and d.c. equipment. Under the present accelerated production pace, working faces move farther away from the power sources in a shorter time, with resultant drop in voltages between substation units and mine workings. Low-voltage operation of motors containing shunt-field coils results in burning up armatures and consequent use of both strategic materials and skilled labor in making repairs. Locomotive motors, being series wound and containing no shunt-field coils, are not so adversely affected.

In hand-loading mines covering extensive areas, every possible means of maintaining proper voltages should be exhausted before resorting to the installation of appreciable quantities of copper feeder. This frequently means moving substation equipment closer to the mine loads, thus extending primary distribution with the use of small wire rather than secondary with large d.c. feeder cable. In mines with extensive development, however, low-voltage conditions are experienced near the property lines. Such territories often are near substation equipment with an excess capacity in ad-

joining property. In such instances, power should be obtained, for the duration of the war, from such neighboring substations. To accomplish this, it is necessary that:

1. An opening be provided in any barrier pillars between properties.
2. Arrangements be made for metering transferred energy and making equitable charges for it.

3. Permission be obtained from power companies and public-service authorities for such resale of power during the war.

In view of the existing emergency, these things should present no great difficulty.

No Feeders or Moves Needed

Operating voltages, however, may be raised generally without resort to mine feeder, substation moves or connection with neighboring properties by applying old and proved electrical principles that have not been widely adopted in coal mining. The Edison, or three-wire, system of d.c. power transmission is a case in point.

The three-wire system is especially applicable to many mechanized mines where loading is concentrated. In addition, a number of such mines have been developed in recent years with light steel rail and relatively small conductors. Since the declaration of war, they have had to increase their rate of development and now need better power at a time when materials for increasing the capacity of electrical circuits are hard to obtain and are vital to the nation.

An example of how the three-wire system might be applied will be discussed in the following material. The mine might be assumed to be operating two shuttle-car sections, each containing the following equipment:

- 1 Joy 14 BU loading machine.
- 1 Goodman 212-AA cutting machine on Joy caterpillar truck.

- 1 coal drill.
- 1 car-spotting hoist.
- 1 bank-car loading elevator.
- 2 Joy cable-reel shuttle cars.

Track is 35-lb. and power is supplied by two 150-kw. 275-volt generators operated in parallel. Haulage is accomplished with an 8-ton locomotive pulling to a sidetrack 3,000 ft. from the substation. One working section is 375 ft. farther up the main entry from the sidetrack. The other is 600 ft. distant in a cross entry. Gathering is handled by the shuttle cars, but two 6-ton locomotives are available for incidental haulage between the sections and the sidetrack.

The positive side of the electrical circuit consists of a 6/0 trolley wire for the haulage and two 500,000-cir.mil feeders for the sections. The feeders are parallel to the sidetrack, where they separate, one going to each section. The haulage wire and the section wire are served at the substation through separate circuit breakers. Such separate circuits are not uncommon in mechanized mines, as breaker outages connected with haulage are thus prevented from interfering with production of coal at the face.

Each section can be expected to impose a diversified load on the electrical system of 400 amp., or a total section circuit loading of 800 amp. The haulage also can be expected to impose a load of about 400 amp. maximum, effective at the sidetrack. Under such conditions, voltages in the mines should be:

Without haulage load imposed—at section on main entry, 197 volts; at section in the cross entry, 193 volts.

With haulage load imposed—at section on main entry, 174 volts; at section in cross entry, 170 volts.

Minimum voltage on tramming circuit, 168.

These voltages, it is clear, should be improved, as equipment should oper-

ate at voltages between 200 and 275 as a maximum variation.

Voltages in the mine can be raised to the desired values by installing an additional 1,000,000-cir.mil feeder on the positive side of the section circuit as far as the sidetrack, together with 750,000 cir-mils on the bottom in parallel with the track. With such improvements, the voltages would be:

Without haulage loading—at section on main entry, 237 volts; at section in cross entry, 233 volts.

With haulage loading—at section on main entry, 231 volts; at section in cross entry, 225 volts.

Minimum voltage on tramming circuit, 214.

These voltages are sufficient to prevent many failures of equipment, but over 16,000 lb. of copper cable is utilized in securing them.

Application of the three-wire principle to the mine will, with existing copper, result in even higher voltages. It is accomplished by connecting the two generators in series rather than parallel, connecting the mid point of the system to the rail and separating the 500,000-cir.mil feeders, connecting one to the remaining terminal on each generator. A potential of 550 volts now will exist between the two feeders at the substation, but only 275 volts will appear between either feeder and the rail.

A third circuit breaker should be provided and the haulage trolley connected to either of the generators. One of the feeders should feed one section and the other the remaining

one. The accompanying sketch shows the connection of the generators, as well as the arrangement of trolley and feeder. One feeder is shown in the aircourse, as such an arrangement keeps the feeders, between which 550 volts exists, safely separated. The working sections are denoted by A (on the main entry) and B (in the cross entry). With such connections, voltages in the mine should be:

Without haulage load—at section on the main entry, 243 volts; at section in cross entry, 239 volts.

With haulage load—at section on main entry, 220 volts; at section in cross entry, 262 volts.

Minimum voltage on the tramming circuit, 215.

These voltages are the highest of any discussed, except for the voltage at the section on the main entry with the tramming load imposed. With the three-wire system and the haulage fed from the same generator as the A section, imposition of the maximum tramming load at the sidetrack will lower the A-section potential by 23 volts and raise the B-section potential by the same value. However, the maximum tramming load is intermittent and hence this variation is not important.

A third circuit breaker is used with the three-wire system as illustrated, but this is easier to obtain than 16,000 lb. of copper and the resulting conditions are superior to those provided by the copper. Not only is such a move profitable to the operator but it aids the war effort as well.

The difficulty in departing from past methods of handling mine power is to get such departures accepted. The three-wire system has been suggested repeatedly, and the most frequently heard objections (with the answers to them) are as follows:

1. "It's dangerous—550 volts rather than 275." By keeping the feeders located so that contact with both simultaneously is impossible the maximum shock to be experienced, line to ground, will be held to 275 volts. Even with both feeders run along the same rib, the danger certainly would not be as great as an assignment in, say, Guadalcanal or Tunisia.

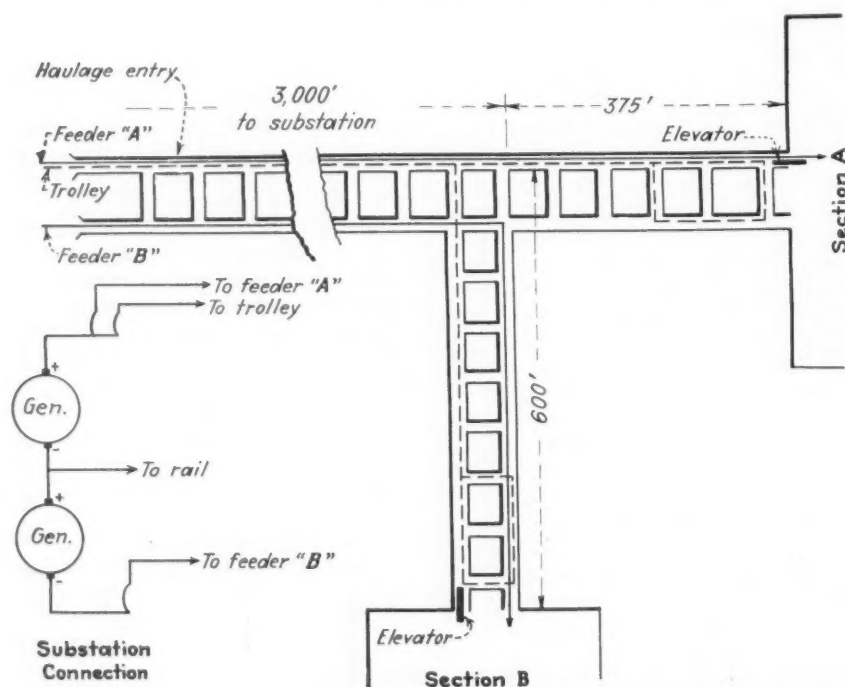
2. "The department of mines will object." This is not probable. If the conductors are placed so that the maximum shock to be experienced, line to ground, is 275 volts, there is no reason for objection. Surely, during the national emergency, no objection is justified.

3. "It's complicated and will confuse my electricians." The system is exactly the same as the 110/220-volt three-wire a.c. system used in mine-town house lighting, with which electricians are familiar. When electricians are brought to realize this, no trouble will result.

First Use at Gay

The three-wire system for mechanized mining was first applied in the southern West Virginia fields by the Gay Coal & Coke Co., at Mt. Gay. There, the system was installed in the company's No. 3 mine on the authority of H. S. Gay, vice president and general manager. The mine contains but one shuttle-car section and two 6-ton locomotives. However, the locomotives, bank-car loading elevator and car-spotting hoist were powered from one of the feeders and the face load from the other, thus obtaining a fair balance of current. An increase of about 15 percent in operating voltage resulted.

During the national emergency, at least, when departure from past practice and application of other principles of electrical transmission can effect conservation of vital materials, such departures should be made. And since they prove profitable, why should their application end with the war?



Wiring details for three-wire d.c. transmission in mine with two shuttle-car sections.

CABLE SPLICING

How Factory Methods Can Improve Results

Factory Splicing Provides Flexibility Nearly Equal to Original Without Increase in Over-all Diameter—Same Methods Can Be Used at Mines With a Little Practice—Splice Life Greatly Extended

By **R. B. McKINLEY**

Wire and Cable Section

And **C. H. SEABERG**

Wire, Cable and Conduit Engineering
Section, General Electric Co.

THE OCCASION often arises for the manufacturer to make splices in rubber-jacketed mining cables. These factory-made splices have stood up in service practically as well as the rest of the cable. The same result is not usually obtained in the field—mainly because of the difference in technique. As this splicing problem is now more important than ever before, an account of factory experience is offered with the hope that it will benefit those who are trying to obtain the maximum salvage value out of their present cables. With a little practice the mine personnel could make a very satisfactory joint of the design which will be illustrated.

Before proceeding with the details of the factory type of joint let us review the most common types of splices. Normal practice in making

cable joints is to use some type of copper connector and to apply sufficient splicing tape so that the thickness of insulation is approximately 50 percent greater than that applied at the factory. For the usual power-cable application this construction is advisable. However, portable mining cables operate under very different conditions and this procedure is not satisfactory. When solder is used in applying a split copper connector, the solder runs along the conductor strands, producing a very stiff section with a shorter life under continued flexing.

To overcome the difficulties of a soldered joint, clamp-type connectors have been most widely used. These produce a more flexible joint but still have the disadvantage of increasing the conductor diameter at the joined section. An increase in diameter at this point means that the splice must be larger than the rest of the cable or that the insulation or jacket thickness must be reduced. The most common practice has been to increase the diameter. Usually the result is a relatively abrupt change in the over-

all diameter at the point where the cable meets the splice. The increase in diameter and the abrupt change lead to premature failure of the cable because the joint continually gets caught in a rail frog or becomes jammed at a rough corner rib. Strains are thus applied to the cable just at the point where they should be avoided.

The factory-made type of splice has a flexibility comparable to that of the original conductor and an over-all diameter the same as the rest of the cable. There is, therefore, no tendency for strains to occur at the spliced portion. Even when the cable is fed through the guide rolls to the gathering reel at a sharp angle the splice passes through as easily as any other portion of the cable.

Procedure in factory splicing is shown in the accompanying illustrations. The cable is a 2-conductor flat-type unit with each conductor composed of 133 strands. The conductor has a center bunch of seven wires followed by six bunches in the second layer and 12 bunches in the third layer.

HOW TO SPLICE CABLE BY THE FACTORY METHOD

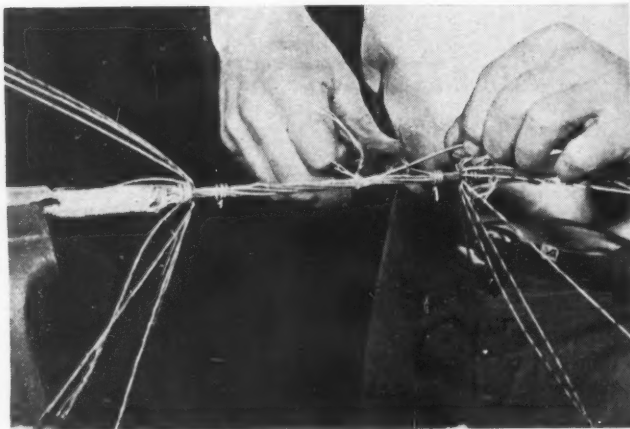
1 Before the operation described in Step 2, the following had already been done: The two ends of the cable to be spliced were secured in position so that the ends overlapped slightly less than the length of the splice of the individual conductor (this was necessary so that the individual brazes could be staggered, as explained later). After removing the outer coverings from one end of the cable for the distance shown, a tie-wire of two or three turns was wrapped around the conductor. This was placed at the end next to the insulation. The outer layer of wires was then bent back out of the way as shown. Another tie-wire was then placed over the next layer of conductor strands and these six bunches also

were bent back out of the way. The other end of the cable was prepared the same way. The center bunch of strands from each end was then cut off so that the two ends would butt against each other at the center of the joint. This center bunch was brazed and smoothed with a file and emery cloth to free it from burrs.

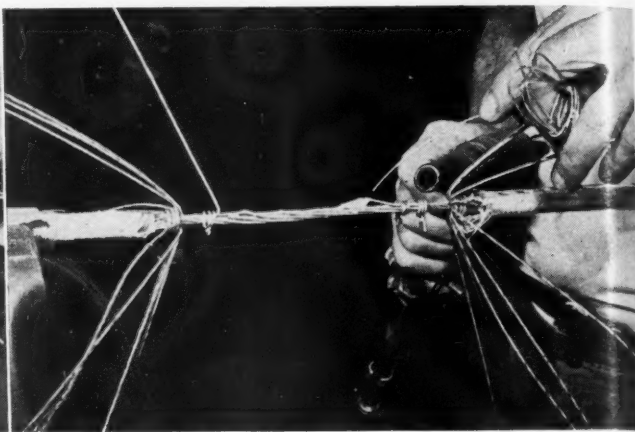
Starting at the right-hand tie-wire, all of the bunches in the second layer were respliced around the center bunch with approximately the same length of pitch as in the original conductor. These bunches were cut off just short of the tie-wire on the left-hand side. A third tie-wire for this layer was applied to hold these bunches in position. One of the bunches was then brazed to the cor-

responding bunch from the left-hand end (the bunch selected for this was such that the braze could be made on the upper side of the conductor near the left-hand tie-wire). The bunch adjacent to the one just connected was then laid into position and also brazed. This and succeeding brazes were made at different spots so that they would be staggered along the length of the conductor. This same procedure was followed for the remaining bunches in this layer. In making the successive brazes the third tie-wire was moved along the conductor, as this facilitated holding the bunches in position. As the brazes approached the right-hand side a fourth tie-wire was found to be helpful, as illustrated in Step 3.

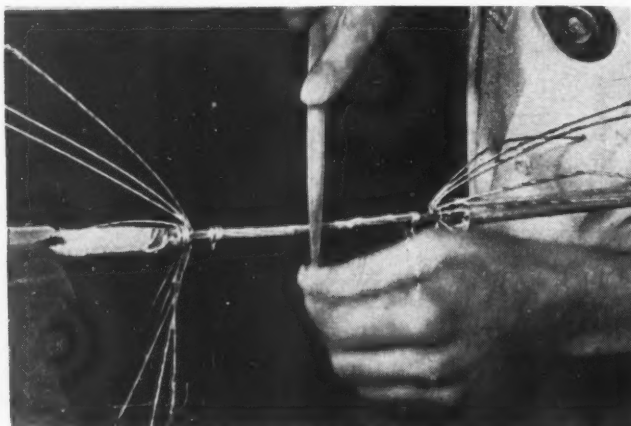
HOW TO SPLICE CABLE BY THE FACTORY METHOD—continued



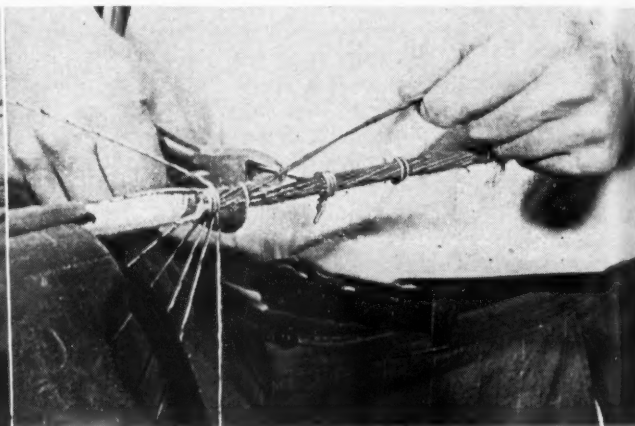
2 Cutting off one end of a conductor bunch. The bunch from the other end of the splice, to which it is to be brazed, has been cut to length and formed in place.



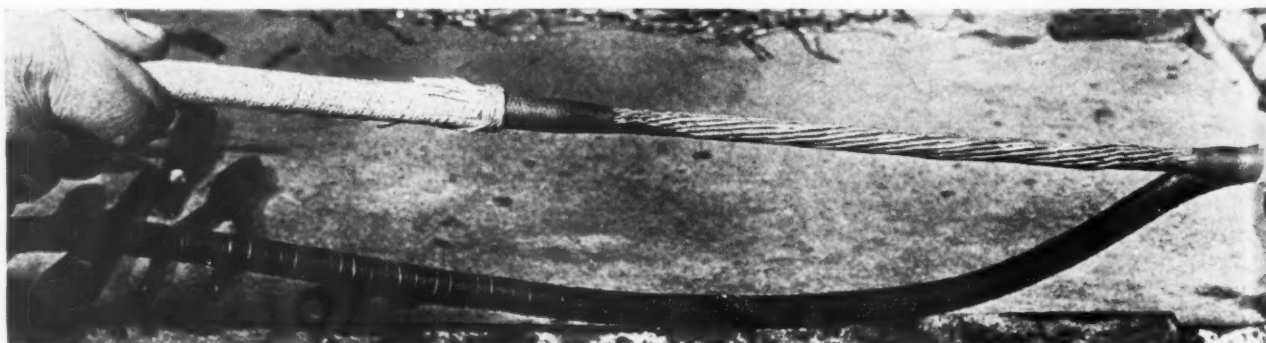
3 Brazing flux has been applied to butted ends of a conductor bunch and the brazing is ready to start, using an oxyacetylene torch (flame did not photograph).



4 Immediately after the torch is removed the wires are pushed into their final position. As soon as it has cooled slightly, the braze section is pried up slightly with a knife point to make sure it is not bonded to any of the other bunches. Some bonding usually will result but may be loosened easily. Here, all the individual bunches in the second layer have been brazed. The conductor is being trimmed with a file to remove rough burrs. After this has been done, the conductor can be given a final smoothing with emery cloth to remove any residual roughness.



5 Cutting the bunches in the outer layer preparatory to brazing. It may be noted that two bunches are brazed at one time in this layer. This is to decrease the time required, as this layer contains twelve bunches. Notice also the location of the tie-wires to hold conductor strands in proper position. The one to the right of the braze is tightened with pliers, as it can be slid along the conductor as the brazing progresses. The one immediately to the left of the braze is merely twisted by hand, as it must be taken off and reapplied after each braze.

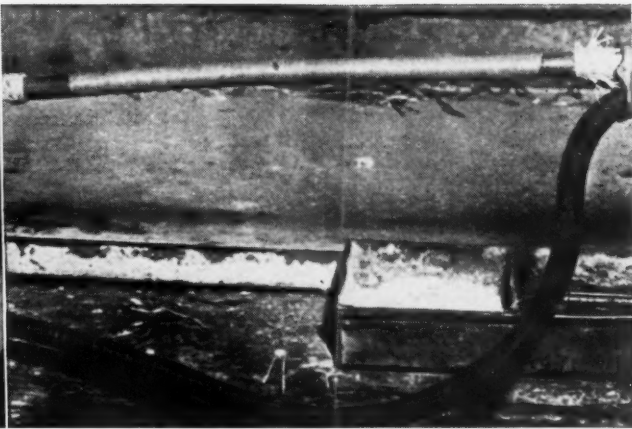


6 The completed conductor splice. The insulation has been penciled with a sharp knife and smoothed with

abrasive cloth. Note the uniform diameter of the finished conductor and the smooth taper of the insulation.



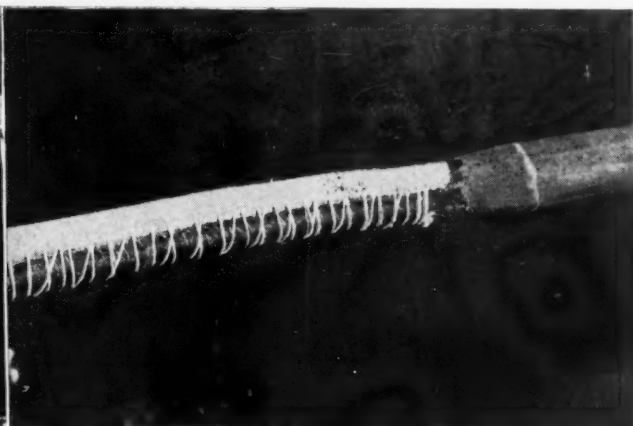
7 Rubber splicing tape being applied, starting at center of joint. Before taping, both conductor and exposed rubber insulation were covered with rubber cement.



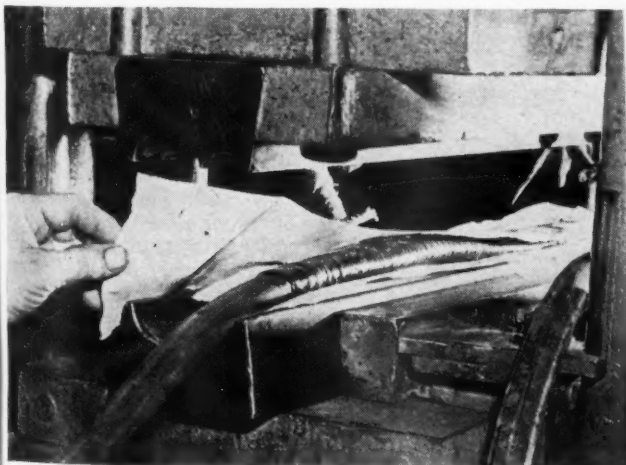
8 Taping the single conductor has been completed. Note that the diameter over the spliced section is the same as that of the original cable.



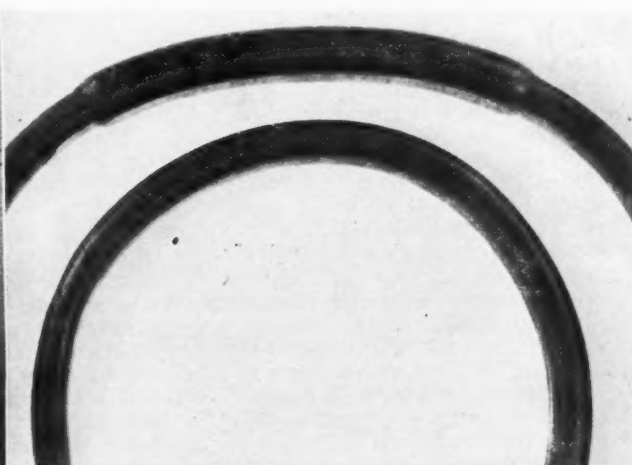
9 A close wind of cotton is applied over the individual splice for reinforcement and to substitute for the braid on the original cable. A tape would have decreased the flexibility of the completed joint. Wound this way the splice will bend freely.



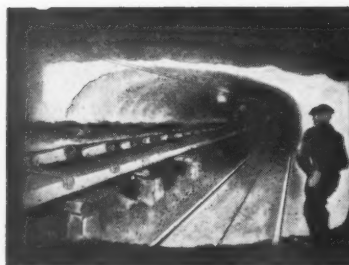
10 The two cotton-wound individual conductors are bound together with an open wind of cotton. The edges of the over-all jacket are tapered, smoothed with abrasive cloth and covered with rubber cement. Splicing tape is then applied over the whole joint.



11 The completed splice being placed in the mold for vulcanizing. The glazed cotton cloth used between the joint and the mold is not necessary if a suitable mold dressing is used to keep the cable from sticking. This mold keeps the diameter the same throughout, so there is no enlargement at the splice.



12 Showing the difference between two splices when bent. The bottom was made in accordance with the procedure described and illustrated in this article. The top splice was made with copper connectors and was vulcanized in a mold, increasing the diameter at the splice over that of the remainder of the cable.



THE FOREMEN'S FORUM

How Moisture That Destroys Some Mine Roofs Is Removed by Sprinkling With Water

COLD AIR can hold less moisture than warm air, for when air is cooled it seems to squeeze out the moisture. In the summer, the air at the entrance to a mine is hotter than the roof, floor and sides of the passages in the mine. In consequence, the air entering the mine, if it is carrying at that time all the moisture it can hold, will part with some of it as it cools slowly down to mine temperature because of its contact with the mine surfaces.

When air contains more moisture than it can hold at the prevailing temperature, it deposits that part of the moisture all of which it no longer can hold as little beads of water forming dew, mist, rain, snow or, as it is sometimes incorrectly stated, "sweat," and this moisture falls on the substance that cools it, for the air is most cooled where it actually touches the cooling body.

In view of these facts, it suggested itself to someone to cool air at the entrance of a mine to the temperature of the workings, before letting the air enter the shaft, slope or heading. In this way, the moisture in the air would be reduced to just the right quantity that the air could carry at that temperature. Thus the excess moisture would be deposited on the outside of the mine and not taken inside. In this way, it would not cover roof, floor and sides of mine passageways and rooms with what is known as "sweat."

If water which is as cool as the mine air is thrown by sprays against the intake air, it cools the air almost to the mine temperature. The moisture dropped by the air is deposited on the water that did the cooling. Some of this water will fall, but some will be carried along as a fine mist and, by putting baffles at right angles to the route by which the air is compelled to travel, almost all those minute beads of moisture will be deposited on the baffles (known as eliminators) and, when gathered up on these blades, will be compelled to fall in a stream of water.

In this way, the air will be prepared so as to enter the mine with only such water as it could carry at the mine temperature; no more and no less. The only time when this would not happen would be when the air at the entrance to the mine has much less moisture than it could

carry at that temperature, which condition is described as "unsaturated." If the air is saturated or nearly saturated, and the mine is much colder than the surface air, the air entering the mine will be entirely saturated when it enters the mine, but it will have no more moisture than is permitted by saturation.

The air may be undersaturated when it arrives in the mine but never is oversaturated. Perhaps the mine, nevertheless, will take up some of the moisture from the saturated air, but it will do so only slowly and in small quantity. If paper of a certain kind is present, it will take the moisture from the air if only 30 percent saturated—that is, if the air contains only 30 percent of the quantity of moisture it can hold at that temperature.

Every miner has noted how paper will get damp in the mine even when the roof, floor and coal are dry, showing that the inside of the mine is not as willing to take up water as certain kinds of paper. Unfortunately, we do not know much about the ability of rock, clay and coal to take up moisture from unsaturated air. Perhaps coal is the least disposed to take up water, and shale or clay the most inclined to do so, but that relation so far has not been established.

It has been found at the Beech Bottom mine of the West Penn Power Co. that it is feasible, where no cool water is available, to use the water or "sweat" obtained by cooling the intake air, and to use over and over again the water originally used for cooling. But this water is warmed by the hot air that it has cooled. So it is necessary to cool it; however, that can be done by using the cool air from the mine. Thus, the water from the air coolers is sprayed in a water cooler in the presence of the return air from the mine, and the result is cool water that can be used in the air cooler.

In the winter, the air on the outside of the mine is colder than the air inside the mine and when it is warmed by the mine the air is well below saturation point, and it dries out the workings, causing shrinkage of every part of the mine, but particularly shrinkage of the shales as a result of the drying and also of the cooling. This weakens the rocks and the coal, especially the shales. Also, and this is still more important, it makes an explosion

and a fire hazard. So it seems well to warm the intake air and give it the required moisture just before it enters the mine. It can get some of this heat and moisture from the return air, for it is nearly saturated and it is more greatly heated than any other air in the mine, unless some cool unconditioned air has been allowed to enter the workings. If the air were recirculated again and again, there would be no need for replenishment of air or water, but because both are taken from the surface of the earth, water and heat are in excess in the summer and in short quantity in the winter.

It has been found that cooling and heating are not as effective as wetting in destroying the Pittsburgh shales. Perhaps other shales will act in the same way. In mines which are given conditioned air after construction, much of the damage due to expansion from the heat of sunny air and much of the damage due to contraction from the chilliness of winter air already has been done when air conditioning is introduced. But perhaps repeated heating and cooling yet can do harm, for the materials will not go back where they were.

There may be a certain degree of what is termed "set." The past misfortunes of a rock or piece of coal may not be corrected by returning it to its original mine temperature. Crevices caused by them may not be healed. Rocks that have slipped out of place may not be able to return to their former position. Even molecules may have parted from other molecules and may be unable to return to their original status, just as happens with steel unless it has been annealed. The *status quo ante*, as statesmen say, may not be restored. But this is merely a theory, not an established fact—a theory the U. S. Bureau of Mines wants to prove or demolish by determining the facts at the Experimental and Beech Bottom mines.

Blackdamp Is Lighter Than Intake Air

Blackdamp often is lighter than air because it has a low percentage of carbon dioxide and a high percentage of nitrogen, which latter is a little lighter than air. Coal Age published two staff articles on this subject July, 1941, p. 60, and August, 1941, p. 57.

In responding to an address by Dr. T. D. Jones to the North Staffordshire Branch,



Don't put Johnny on the spot!

HERE'S HOW TO CARE FOR YOUR EXIDES:

- 1 Keep adding approved water at regular intervals. Most local water is safe. Ask us if yours is safe.
- 2 Keep the top of the battery and battery container clean and dry at all times. This will assure maximum protection of the inner parts.
- 3 Keep the battery fully charged—but avoid excessive over-charge. A storage battery will last longer when charged at its proper voltage.
- 4 Record water additions, voltage, and gravity readings. Don't trust your memory. Write down a complete record of your battery's life history. Compare readings.

If you wish more detailed information, or have a special battery maintenance problem, don't hesitate to write to Exide. We want you to get the long-life built into every Exide Battery. Ask for booklet Form 1982.

You know Johnny. He's that swell kid from down the street ... or maybe, from your own house. He's "Johnny on the spot" when it comes to a scrap, but don't put him on another, more dangerous spot, by wasting materials he needs for the fight.

Conservation of materials is important. Buy only the best and longest-lasting tools or equipment. Take care of everything you use, and you'll ease the pressure on America's raw materials, industries, and labor.

Exide
IRONCLAD
BATTERIES

Buy to Last and Save to Win means plenty at home and on our fighting fronts, too. It's a big step toward Victory ... and pays dividends in extra use of equipment.

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia
Exide Batteries of Canada, Limited, Toronto

National Association of Colliery Managers, in England, J. Ivon Graham remarked that "in several instances, blackdamp lighter than air might be found in modernized mechanized workings. That had been found to happen in other workings of readily oxidizable coal (hand workings). He had often found blackdamp lighter than air in the Barnsley Seam workings and in those of the South Staffordshire Thick Coal. It meant simply that the greater proportion of oxygen absorbed had disappeared as a result of the oxidation of relatively fresh coal."—*Iron and Coal Trades Review*, April 30, 1943, p. 637.

In the second reference from *Coal Age*, it was shown that in 17 samples, from all over the United States and from various parts of the several mines, only in eight or in a trifle less than half was the blackdamp heavier than air. In the other nine instances the blackdamp was just a little the lighter than the surface air even when the percentage of methane contained in the mixture was eliminated by calculation; that is, the samples probably would all have been lighter than air had the methane in the mine air been made a part of the calculation. Modern blackdamp is light, especially where electric lights are used, which do not burn the methane in the air to carbon dioxide.

It Pays to Use Dry Props As They Are Stronger

Mine props are 20 to 50 percent stronger when they are dried, is the finding of the Safety in Mines Research Board of Great Britain in its latest annual report (1941). Even after splitting lengthwise, they are still stronger than unsplit props which have not been dried.

The strength of a prop, says the Board, can be materially increased and economies effected in the consumption of timber by suitable seasoning for short periods underground. Average moisture content of 335 props at ten different collieries before being sent underground for immediate use at the coal face was 31 percent. Highest recorded moisture content was 130 percent of the dry weight and the lowest a little under 13 percent. Reducing the moisture content of the props from about 30 to 15 or 16 percent by short periods of seasoning in return airways increased their crushing strengths 20 to 50 percent. The period of seasoning depends on the original moisture content, the atmospheric conditions in the airway and the sizes of the props.

In an air current of 525 f.p.m. at a temperature of 84.5 deg. F. and humidity of 64 percent, the moisture content of spruce props 5 ft. long and 6 in. in diameter was reduced from 30 percent to 15 percent in ten days. When the air flow was 425 f.p.m., the temperature 77 deg. F. and the humidity 47 percent, the moisture content of pine and spruce props was reduced from 25 percent to 10 percent in a maximum of 19 days and

half the props in 12 days had dried to that extent.

Although props usually split longitudinally from such drying, it has been shown that dried props, even though severely split, usually are 20 percent stronger than similar unsplit props which have been stored on the surface. A small-scale trial at the coal face resulted in 14 out of 24 underground seasoned props being set a second time, whereas only 8 out of 24 similar props sent direct from surface prop stacks survived the first setting.

[Note the temperatures and humidities. R. Y. Williams in 1914 made an exhaustive study on "The Humidity of Mine Air With Especial Reference to Coal Mines in Illinois," U.S.B.M. Bull. 83, and found the lowest temperature in the returns of 17 mines to be 48.9 deg. F. and the lowest humidity 76 percent. Most of the temperatures of the return air were between 60 and 70 deg. and the humidities nearly or actually 100 percent, although Illinois mines, as a rule, have higher temperatures and lower humidities than most mines elsewhere in the United States. For this reason, in this country, props can hardly be dried in the mine, but the necessity for their drying whether inside or out is well emphasized by these data. Conditions for drying on the surface are as favorable in the U.S.A. as conditions underground are unfavorable.]

Accidents Should Have No Part In Mine Engineering

A bridge falls. There was a miscalculation of the stresses imposed or of the strength provided to meet those stresses. Correct engineering would have protected that bridge, would have prevented it from failing. The bridge failed for lack of knowledge, of use of that knowledge or of lack of planning.

Accidents in the mines are not much different. Lack of planning, of vision and of foresight causes many of them. All the contributing factors that cause accidents should be studied and weighed dispassionately. It is bad engineering or bad management that causes most accidents; either lack or badness of design or lack of control. Safety is largely management or engineering, but to date we have barely begun to study the causes and control of roof falls, the most potent cause of accidents. Some of the most obvious facts have not even been stated.

A big bridge falls. It is not regarded as a misfortune to be merely bewailed but as a technical and financial blunder not to be repeated. Its engineer's career is ended. He is afforded no opportunity to make a second mistake. A sea captain drifts on the rocks but once. And an accident, large or small, in the mines similarly is a serious failure of management or engineering. One cannot regard accidents with tolerance, whether they mutilate men or damage only plant or equipment.

Too many accidents are the result of stumbling ahead in the hope that "every-

thing will be for the best in the best of possible worlds," which is just wishful thinking with no relation to the world of inevitable cause and effect. Life just doesn't travel along the road that the wishful thinker has provided. Safety such as he affords lasts only until the several hazards gang up against his management.

Each strut and tie in the bridge has so much strength which must be known and compared with possible loading. There must be no "hoping" that it will meet the stress; no prayer for light winds, limited snow loads or even negotiable floods; just absolute assurance that, come what may, nothing adverse can affect its safety. And so it should be with the coal mine. It should be so planned as to reduce hazards to a minimum even with "hell and high water."

Certain combinations of events or conditions together make an accident. Who then is to say that if, at any time, such events and conditions may separately or severally exist, no time will come when the combination will arrive that will make these several factors total up to form an accident. The hope that favorable combinations will occur makes men gamblers; the fear that unfavorable conditions will occur should make us all safety conscious.

First-Aid Treatment For Eye Injuries

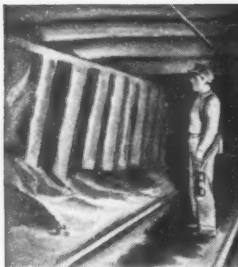
Research by the W. H. Ross Foundation for the Study of Prevention of Blindness, 20 Lauriston Place, Edinburgh, Scotland, has demonstrated, declares S. W. Fisher, Chief Mine Medical Officer, Ministry of Fuel and Power, in the *Colliery Guardian*, April 9, 1943, that if the eye is treated with a soluble form of sulphonamide—10 percent albucid solution (sodium sulphacetamide)—it will be better protected by that medication against infection than by any of the usual eye drops. These sulphonamide drops, declares Dr. Fisher, were used experimentally at 30 Scottish collieries instead of No. 1 eyedrops consisting of cocaine and perchloride of mercury in castor oil.

The results "were highly successful, as testified by doctors, managers, ambulance men and miners alike. A large number of injuries of the eye were treated and, in over 96 percent of the cases, there was no loss of working time. The drops were found to be soothing as well as effectively preventive of infection and were greatly preferred by the men. . . . The drops are not difficult to apply nor are there any dangers, such as that of an overdose, to guard against. The patient should be seated in a good light, and the hands of the first-aid men should be thoroughly cleansed. The solution is administered by pulling the lower lid forward and using a brush or small rubber sponge and then an eyeshade or light dressing should be secured over the eye and the patient recommended to go to his doctor as soon as he can." The solution deteriorates and must be renewed every second month.

TREMENDOUS TRIFLE

The amount of calcium chloride required to adequately dustproof a ton of coal is small indeed in relation to the weight of coal. Yet the effect on coal consumers — in making them like coal instead of just tolerating it — is tremendous, and the best possible insurance for a healthy post-war market. But, some coals need more calcium chloride than others and it is here that a "trifle" can really be "tremendous." ¶ For the lack of just an extra pound or two of calcium chloride

per ton, dustproofed coal that would otherwise be judged entirely satisfactory may bring complaints now and loss of business after the war. So — to hold your customers and keep them secure against peacetime competition — make sure that every ton of domestic coal you deliver is treated with that extra trifle of calcium chloride which makes it completely dustless. Ask us for a copy of Bulletin No. 37. Calcium Chloride Association, 4145 Penobscot Building, Detroit, Michigan.



STATE-BOARD QUESTIONS

Mine Foremen's Quiz, West Virginia[†]

The following questions have been selected from those included in "The Mine Foreman's Guide," used as the basis for examinations in West Virginia. The answers given in the guide, which normally are quite brief, have been supplemented by comments and data, which the editors of COAL AGE hope will be of assistance to those interested in these subjects. The numbers given the questions in the guide follow each in parentheses thus (Ventilation, 128, etc.).

Temporary Seals

Q.—How does a temporary seal exclude oxygen from a fire area?

A.—The expansion of the heated atmosphere will produce a pressure on the inside of the seal (Fires and Explosions, 22).

[When a fire occurs in a mine, the gases it forms are always likely to explode until the time when so much oxygen has been burned away that only 12 percent of that gas is still present in the air. That is true if the explosive gas is all methane. There may be other gases than methane, however, that might make a slightly lower content of oxygen than 12 percent necessary—hydrogen, for instance—but in any event there is a certain percentage of oxygen that will assure safety, and if seals are erected to prevent the fire from getting air and therefore oxygen, and if no explosion occurs before the oxygen gets down to 12 percent or somewhat less, the danger is past, but the seals have to be erected while the danger of an explosion is great and, to avoid exposing the men who build the seals to too much danger, the seals are not made absolutely tight, for that takes time and a lot of care.]

[But the question well suggests that a temporary seal might serve the purpose, permitting the fire fighters to leave the mine before an explosion will occur. Let us think for a moment how a steam boiler acts. When a fire in a furnace has the air partly shut off, it continues to make steam and may do so for hours. The fire is cooling down, but it is still making and delivering heat, even though it is itself cooling off. A mine fire acts in the same way, and it heats the air of the sealed area so much that the air streams out of that area everywhere but especially at any

merely temporary seal, so, instead of the fire taking advantage of the leaky seal to get air, it uses the seal as a means of getting rid of excess atmosphere. For this reason, even a temporary seal will serve for some time, though it is well to remember that the fire might turn the trick by establishing a current from one leaky seal to another and so go on taking in air and expelling its waste products.]

[Will not a temporary seal do indefinitely? No, because when the fire cools enough, it ceases to warm the air faster than it is cooled and then the pressure falls and the air rushes in through the leaks in the temporary brattice and finally it often happens that the air will leak through the best of permanent brattices and through crevices in coal, floor or roof and then the fire will revive, though enough air may not enter to cause an explosion.]

Safety-Lamp Indication

Q.—How does the almost non-luminous flame from the lowered wick of a flame safety lamp enable us to find methane?

A.—By the burning of the methane, which forms a pale blue cap over the flame (Instruments and Apparatus, 46).

[When a flame safety lamp is used to detect methane, the lamp wick is turned down until the flame gives almost no light, but, as there is still plenty of heat, the methane that is drawn into the flame by the current of air burns with a characteristic low-carbon blue flame, which can be seen the better in the darkness which results from turning down the wick and thus reducing the brilliance of the flame which otherwise would result from the burning of the oil or naphtha. Furthermore, when the wick is turned down, the gases from the oil do not rise to contaminate the methane. Should the oil gases thus rise, their combustion would make it difficult for the observer to note the flame of the methane, which is blue.]

[(1) A certain temperature is necessary to burn the methane, and this can be attained only near the wick. (2) Bad air also mingles with the methane. For these two reasons, at a point a short distance above the wick, that gas ceases to burn, unless it is present in so high a percentage that it can continue to go on burning without the presence of externally supplied heat. On the percentage of methane depends the distance which the methane

can continue to burn above the wick and form the telltale blue cap. Thus, the height of this cap indicates the percentage of methane in the air of the working place.]

Coal Dust Explodes

Q.—Under what circumstances does coal dust explode?

A.—When the particles are suspended as a cloud in the presence of a flame or a spark (Fires and Explosions, 5).

[So long as coal dust is not floating in the air, it cannot cause an explosion, but coal dust always is likely to be thrown up into a cloud so as to form what is known as a "suspension." And also, one expects always to find it floating in the air, having been lifted by the passage of air currents or never having settled from the time it first was formed.]

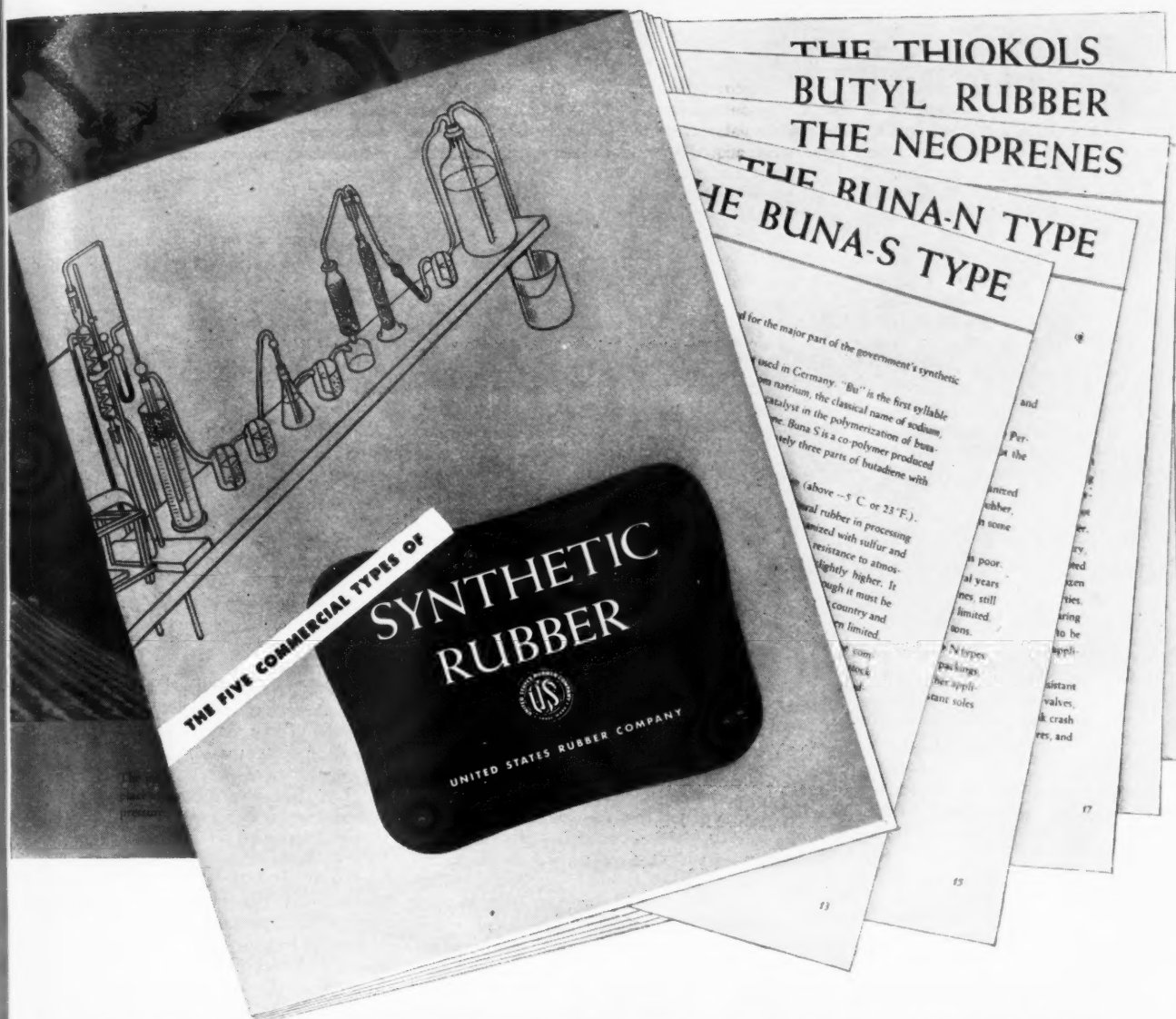
[Some of those occurrences which make flame and sparks also make a disturbance that raises dust. Thus, an explosion of a pocket of methane, however small and in itself relatively harmless, may raise coal dust and make a severe coal-dust explosion. If an electric conductor is broken, it will blow and may raise coal dust.]

[Care should be taken to disconnect trolley wires before pulling down timbers or rock. Because, in one instance, this was not done, a serious explosion resulted. When cleaning off timbers or in removing them, due care should be taken to see that no flame or sparks are present or likely to be present. Loading out coal dust and blowing or sweeping dust off timbers are dangerous operations and should be done when all men, other than those engaged in the work or supervising it, are out of the mine.]

[Falls of roof in the heading also stir up dust and throw it into suspension and when they occur in drawing pillars they drive both coal dust and methane into the heading and make a particularly dangerous condition, especially if a trolley locomotive is passing at the time. For this reason, trolley lines should not be suspended beyond the point where such falls, sooner or later, are likely to occur.]

[The hauling of such fine dust in trips of cars to the surface is another dangerous operation. The cars, if they collide with other cars or leave the track and strike a timber, may upset and develop an immense cloud of explosive dust. A mine in England recently had a severe explosion which was ascribed to this cause. Wetting dust with a hose may stir up a cloud of explosive dust and result in an explosion.]

[†] Continued from June, 1943, *Coal Age*, p. 87.



WHAT IS SYNTHETIC RUBBER? HOW IS IT MADE? WHERE IS IT USED? HOW DOES IT COMPARE WITH NATURAL RUBBER? *You'll find the answers in this new book*

As the supply of natural rubber diminishes, undoubtedly more and more mechanical goods will be made of synthetic rubber...hose, belts, packings, molded goods, tank linings, and other rubber products used by industry.

Having worked in the field of synthetic rubber for more than twenty years, we know what each of the five types will do; what chemicals such as sulfur, carbon-black, or ultra-accelerators must be added,

and how to compound them. We work with all five types; use the type available that is best suited for the purpose.

You can get an over-all picture of the properties and characteristics of synthetic rubber in the new book recently published by United States Rubber Company. A request for "The Five Commercial Types of Synthetic Rubber" made on your company letterhead will be filled promptly. Address your letter to Dept. 4.

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[In fact, making provisions for safety, if not regarded as a hazardous job, is likely to be as dangerous as or more dangerous than operation without such provisions, and before making them the men should be made acquainted with the hazards which they are to face.

[Like any unusual operation, it should have its risk weighed before being undertaken; and the men who perform it should be instructed as to the safe way of performing it. They may be shoveling "bug dust" daily with some degree of safety, but the fine air-borne dust, all of which will pass a 100-mesh screen and most of which is much finer, is a wholly different material and has a kick like an army mule.

[Cleaning around conveyors and dismantling them are particularly dangerous. Conditions round a dumping point

underground also are more than usually hazardous. So also are shuttle-car roadways with their deposits of dust, finely ground by the rubber treads of the cars. When a fall of rock, however caused, brings down trolley wires, a dust cloud, a short circuit and an explosion are likely to occur. Excessive air speed may raise a stream of dust, especially from the discharge of an auxiliary ventilation duct or an air hose, but there is danger even with a big split or the main current, if the speed of the air is excessive. Explosives or a blow-out shot have a similar effect. After the accident has happened, it does no good to say, "It never happened with me before."

[Remember also that the return current may make sparks at broken connections, and that static current and telephone and signal "makes and breaks" may fire gas and dust.]

Coal mines should have several sets of oxygen-breathing apparatus available at the mine or at a central mine-rescue station near by, with at least one full 100-cu.-ft. cylinder of compressed oxygen for every two apparatus. A hand or power-driven oxygen pump with extra gaskets and repair parts should be available. Sufficient regenerators or regenerating chemicals should be on hand to provide ten charges for each apparatus. Life lines on reels should be part of the rescue equipment. The rescue equipment should be stored in a dark, cool, dry place because rubber deteriorates in high temperatures and the fabric is affected by the presence of moisture.

The men selected for mine-rescue crews should have frequent training under simulated actual mine-fire conditions. The oxygen-breathing apparatus should be well-cleaned and dried after each practice use and, to prevent bacteria fouling the parts, the parts that come in contact with the wearer should be disinfected with a 2-percent solution of lysol. The apparatus should be stored singly in boxes or cases such as those provided by the manufacturer.

Self-rescuers or gas masks can be used safely only in atmospheres containing sufficient oxygen to support life—about 17 percent. Too much dependence often is placed on gas masks, the wearer overlooking his need for oxygen and thinking only of the noxious gases evolved. A permissible flame safety lamp always should be carried by one of the gas-mask crew to warn of oxygen deficiency. Persons wearing self-rescuers should be instructed in their use and particularly warned to be extremely careful if the "rescuer" becomes too hot. If the air seems to burn the mouth, it is an indication that the carbon monoxide present is excessive and the wearer will soon be exhausted. The use of a self-rescuer is limited to one-half hour, and the apparatus must be protected from abuse at all times. Self-rescuers are not suited to combat mine fires and should be used only as an aid in escaping to fresh air.

Q.—A sump 12x7x210 ft. has an inflow of 80 gal. per minute. How long will it take to empty the full sump with a pump having a capacity of 350 gal. a minute but which runs at only 75 percent efficiency?

A.—The sump contains 17,640 cu.ft. of water when full. A gallon of water, you should recall, occupies 231 cu.in. A cubic foot is 12x12x12 in. = 1,728 cu.in. As 231 divided into 1,728 gives 7.48052 there must be 7.48052 gal. in a cubic foot, so the sump must contain 17,640x7.48052 = 131,956 gal.

The pump delivers 75 percent of 350 gal. per minute = 262.5 gal. per minute. Unfortunately, 80 gal. per minute is entering the sump, so the decrease in quantity is 262.50 - 80 = 182.5 gal. per minute.

The time it will take to rid the sump of water = $\frac{\text{volume in gallons}}{\text{net gallons per minute}} = \frac{131.956}{182.5} = 723.0 \text{ min.} = 12\frac{3}{4} \text{ hr. } 3 \text{ min.}$

First Class Foremen, Washington State*

What to Do in a Fire

Q.—A good mine foreman will always make plans ahead against serious happenings that may suddenly come upon him. How would you prepare yourself against the moment that fire would break out in your mine?

A.—Definite plans should be made in advance as to the best way in which to warn all men of the presence of the fire, telling them to leave any part of the mine in which a fire has occurred, and to determine with the management if, in cases of fire, all persons in the mine should immediately be removed from the mine. A list of persons to be notified in case of a mine fire should be prominently posted in strategic places in the mine and at the surface. This list should include the State mine inspector, general manager, superintendent, doctor, U. S. Bureau of Mines, mine electrician and mechanic. Mine telephones should be installed at convenient locations, preferably at least one telephone in each section of the mine and so placed that the bell usually will be heard by employees. Capable men should be selected from each section of the mine to assist in case of emergency. These men should be selected carefully, keeping in mind their availability as well as their reliability in time of trouble. This selected crew of men should be given periodic training in the desired procedure, using different parts of the mine as the location of the fire.

The necessary equipment for fighting fire should be placed at quickly accessible points in the mine. Fire extinguishers of the soda-acid type—not less than 2½-gal. capacity—should be placed at safety stations, intersections and near permanent mechanical installations. Large soda-acid extinguishers mounted on mine-car trucks are desirable or, if not provided, large water tanks on mine trucks with pump attached can often be made available from

materials on hand at the mine and can be used in some types of mine fires. Extinguishers suitable to use on an electrical fire should be provided. Sacks of rock dust should be placed at each mine door and at least 20 sacks of rock dust should be kept at each intersection.

Sufficient supplies of boards and posts for the erection of brattices should be maintained in the various mine sections. Tools to be used only in case of emergency, such as fire, should be kept in properly sealed cabinets or boxes. The tools should include as a minimum one two-man crosscut saw, one small hand crosscut saw, one rip saw, two copper-headed hammers, assorted nails, two picks, two shovels, and two or three hatchets. Assorted pipe fittings also should be stored in the tool boxes if water lines have been installed in the mine. Spare pipe always should be stored in racks underground when water lines are available; hose with suitable connections also should be provided. Bags of rock dust should be stored with the reserve supply of boards and posts. An anemometer, barometer, maximum and minimum thermometer, oxygen inhalers and first-aid supplies should be kept available on the surface for use in emergency.

Every man in the mine should be familiar with the coursing of the ventilating air in his section and the best way to escape from the mine in case the usual method of exit, such as a man-trip, is blocked. Definite plans should be made to short-circuit the air if necessary or desirable to do so. Reversal of the mine fan is desirable in some cases, and the effect of this action always should be carefully considered. On receiving notice of the fire, arrangements should be made to cut off the electric power immediately.

Materials for making fire seals should be placed where they can be obtained quickly and easily. These materials should include an adequate supply of brick or tile, canvas and some type of plaster such as wood pulp.

* Continued from June, 1943, *Coal Age*, p. 86.

West Virginia Coal and Coke Corporation has 535 new Timken Bearing Equipped mine cars in operation

Trip of new Timken Bearing Equipped mine cars hauled by new 15-ton Timken Bearing Equipped locomotive at No. 19 mine of the West Virginia Coal & Coke Corporation.

As part of an extensive modernization program, the West Virginia Coal and Coke Corporation placed in service the first of the year, 535 new all-steel mine cars manufactured by American Car & Foundry Company, Huntington, W. Va. and equipped with Timken Tapered Roller Bearings on all axles.

Although these cars are only 20" high above the rail, they normally carry a 3-ton load, but by the addition of 10" sideboards for which they are designed, the capacity is increased to 5 tons per car. As arranged for maximum capacity, the cars are adaptable to coal from 32" to 11' in height.

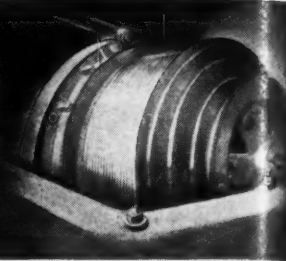
Besides the new mine cars, 4 new low-height General Electric haulage locomotives — 2 15-ton and 2 8-ton — have been purchased. These are equipped with Timken Bearings in all journal boxes and in the gear drive units; there are 2 of these gear drive units in each of the 15-ton locomotives and 1 in each of the 8-ton locomotives.

Despite the tremendous number of Timken Bearing Equipped mine cars in service, haulage still is a bottleneck in many mines using obsolete equipment. Is it in yours? The Timken Roller Bearing Company, Canton, Ohio.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

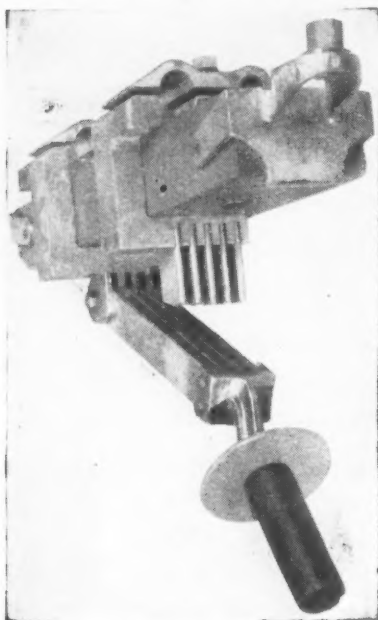
To manufacturers of mining equipment: Keep driving for Victory—but prepare for whatever may follow. Redesign to use more Timken Bearings.

TIPS FROM MANUFACTURERS



Feeder Switches

Mosebach Electric & Supply Co., Pittsburgh, Pa., offers a new line of high-amperage insulator feeder switches designed for 275 to 600 volts d.c. Known as the "Jumbo" line, these new insulator feeder switches can be used for either sectional or main switches. They are double



the size of former switches and employ four $\frac{1}{2} \times 1\frac{1}{2}$ -in. copper busbars.

Mounted on the roof of the mine, the jumbo-type switch is suspended with extension bolts and bolted clamps which hold the cable rigidly. The switch is equipped with a rubber handle and fiber guard that pulls down in open position and is safely locked there by a dowel pin.

Arc Welders

Harnischfeger Corp., Milwaukee, Wis., announces the addition of a complete line of industrial a.c. arc welders to its existing line. Engineered and built for industrial service, these machines are being made in seven heavy-duty and four intermittent-duty models with a range of capacities for handling production welding under continuous operation. Featured are the recently adopted "WSR" (welding service range) ratings which show the actual minimum to maximum output of usable welding current.



Setting and control of current throughout complete welding-service range involves one simple, easy-to-operate adjustment. Improvements in the P&H control are said to make it creep-proof. According to P&H engineers, the a.c. models are marked by a number of other mechanical and electrical refinements which, by actual field tests, have shown an increase in operating efficiency to as high as 95 percent with appreciably reduced maintenance cost.

Motor Starter

Allis-Chalmers Mfg. Co., Milwaukee, Wis., announces the Type H motor starter. Designed for low first cost, the new unit is a metal-enclosed structure similar to metal-clad switchgear. High-interrupting-capacity disconnecting-type fuses are utilized in combination with a heavy-duty oil switch in the new starter.

Type H starters have been developed for both induction- and synchronous-type motors rated up to 1,000 hp. at 2,300 volts and 1,750 hp. at 4,600 volts, 3-phase, 60 or 50 cycles. Their usages cover full or reduced voltage starting, dynamic braking, reversing and special applications.

Short-circuit protection up to 160,000 kva. at 2,300 volts and 320,000 kva. at 4,600 volts eliminates the need for a back-up breaker within these kva. ratings. Disconnecting-type fuses combining high interrupting capacity with fast-clearing action hold short-circuit currents to safe values which do not damage the control. Fuses operate only under actual short-

circuit conditions and will not blow unnecessarily.

The new units are said to protect motors from sustained overloads, locked-rotor condition, single phasing and overloading caused by too frequent starting by means of thermal overload relay accurately calibrated.

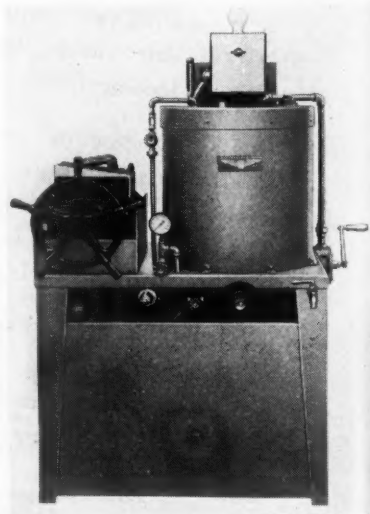
Car Wheel Assembly

Phillips Mine & Mill Supply Co., Pittsburgh, Pa., offers a new car wheel assembly which is said to be easily installed as a replacement or for an original installation on new equipment requiring flanged wheels for operation on rails.

Available in 12-, 14-, 16- and 18-in. wheel diameters, the assemblies feature Timken roller bearings with grease fittings or bronze metalline oil-less bushings for high-temperature applications. These new car wheel assemblies are recommended for incorporating into new equipment design.

Small-Capacity Oil Reclaimer

A new small-capacity lubricating oil reclaimer, Model A-8, designed for small plants and organizations having their own fleets of trucks and motor cars, is offered by the Youngstown Miller Co., Sandusky, Ohio. In addition this unit usually can handle a limited quantity of waste lubricating oils drained from equipment used in the plant. With a capacity for purifying 8 gal. of dirty oil in 70 to 90 minutes the reclaimer will handle 2,500 gal. of



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DIESEL LOCOMOTIVES
GEARED AND ELECTRIC DRIVE
GASOLINE LOCOMOTIVES
GEARED AND ELECTRIC DRIVE
LOAD-CARRYING LARRIES

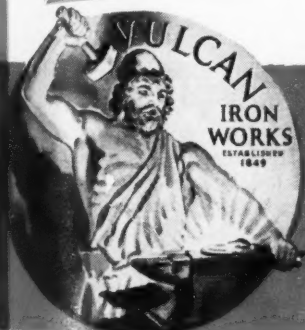
At the Hudson Coal Company's Loree Colliery, located only a few miles from our plant, second mining of seams originally mined more than 70 years ago involves many difficult problems—one of which is bringing coal up out of dipping rooms from 300 to 350 ft. long. And these places really dip. The adverse grade averages eight percent; flattening off toward the bottom but increasing to approximately 17 percent for about 50 ft. back from the discharge ends of the chutes.

That would be a pretty tough proposition for most shaking conveyor drives, but Vulcan ET-1 Drive Units have been doing the work satisfactorily for more than two years with very little expense for repairs or replacement parts.

Each working place has its own conveyor, and operation is necessarily intermittent, but when coal is available the mine cars are loaded at the rate of 20 tons per hour.

Hundreds of other Vulcan Shaking-Chute Conveyors are giving equally satisfactory service today in scores of well known anthracite and bituminous mines — delivering as much as 100 tons per hour under favorable conditions — cutting costs and boosting production wherever properly used.

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waste lubricating oil per year when operated only once a day.

This machine has a two-stage filter press, is semi-automatic, operating under thermostatic control and utilizes common refinery earths available in the open market. For handling larger quantities of oils, these units come in seven other sizes. All models are designed to restore used oils to substantially the same values of fire, flash, viscosity, color, neutralization number and precipitation number as the new parent oil.

Loader

Athey Truss Wheel Co., Chicago, offers an improved model MobiLoader which operates with the Caterpillar diesel D4 tractor. Although simplicity in design is the chief change, the manufacturer states, the new model has increased stability, greater operating range, reduced height to



simplify transportation and lower center of gravity. It has a bucket capacity of 1½ cu. yd.

Made in sizes to fit Caterpillar D8 and D4 tractors, Athey MobiLoaders are characterized by straight-line loading action. Digging the load at the front, the outfit travels in reverse to the truck or fill and discharges the material overhead.

Loader Carrier

For transporting loading machines and other heavy equipment in and around the mine, the Phillips Mine & Mill Supply Co., Pittsburgh, Pa., has developed the Phillips loader carrier. Designed to haul the heaviest machines, it provides a safe, easy and fast means of loader-machine moving in busy war-production mines. Only 3 in. headroom is required and the construction features include Timken roller bearings, wheels removable for loading, wide treads for short curves, and wheelbase of 8 ft. built for any track gage.

Cable Connector

A new cable connector, known as the "Quik-Trik," that locks tight, quickly unlocks and is fully insulated has been developed for use welding by Jackson Products, Detroit 7, Mich.

The female section is soldered to the cable lead; the male section is soldered to the cable extension. Removable insulators are securely held in position with Allen

screws. Connection is made by inserting the male section into the female section. Thus with a twist the locking spring rides the cam into position, holding both sections tight. To unlock, simply twist apart.

When installed on a cable lead, the female section may also be used as a holder handle and connected directly to the "stinger" end of a Jackson Model TA holder. This adaptation saves time and material, eliminates the danger of live cable ends and makes possible the economies of standardization.

Breaker for Belting

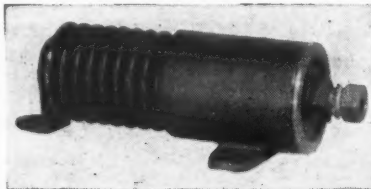
B. F. Goodrich Co., Akron, Ohio, has been granted a patent on its Transcord breaker, used in constructing conveyor belting. Its principal feature is that the breaker cords are placed across the belt width, rather than parallel with the cords of the belt itself. This provides greater resistance to cutting action from materials striking the belt, which most often move faster or slower than the belt itself.

The Transcord breaker also is aid to provide greater adhesion between cover and carcass than the regular breaker construction. Other advantages claimed for the patented construction are: It tends to stop most cuts and gouges before they penetrate to the belt carcass, as the Transcord breaker usually is placed a short distance above the top ply, leaving a protective layer of rubber between breaker and carcass. The patented construction prevents distortion of the rubber cover beyond its elastic limit because of severe impact.

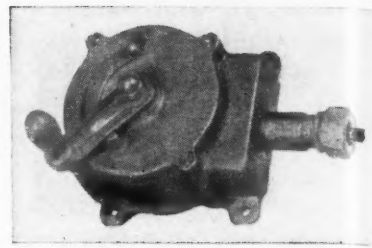
Headlight Auxiliaries

Mosebach Electric & Supply Co., Pittsburgh, Pa., offers a new headlight volt-reducer and holder socket, and a new mercury reversible headlight switch. Designed for operation of headlights on locomotives, they are constructed to carry 275 volts d.c.

The rotary-type mercury reversible headlight switch is equipped with a fuse with sufficient capacity for either or both headlights. When the switch handle is in the forward position the switch operates the front headlight and when reversed



the switch lights the headlight on the rear of the locomotive. The switch is made of Mescos bronze and has two non-sparking mercury tubes—one for the forward position and one for the reverse. It is inclosed in a Mescos bronze case with a double seal to protect it against dirt and moisture. The switch should be mounted



vertically to keep the mercury at the bottom of the tubes.

The headlight volt-reducer socket is equipped with air-cooling fins, and rubber bushing and packing nut to insure a perfect inclosure.

Maintain Oil Circuit Breakers And Prevent Costly Delays

"To prevent costly failures and delays in operation, it is important that the starting breaker function properly when an emergency arises," says N. P. Wilson, Engineering and Service Department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. "To accomplish this reliability, it is necessary that the breaker receive thorough inspection and maintenance. Motor-starting oil circuit breakers are designed for general starting service. When properly applied they protect the motor from overloads, short circuits and sudden application of full voltage to the motor after it has come to rest.

"The frequency of inspection and maintenance depends upon the severity of the duty the breaker must perform and the condition of operation. Usually a light monthly inspection with a thorough inspection and maintenance semi-annually should be satisfactory. However, in some cases breakers operating under very active and severe service may require more frequent attention. Other breakers that operate infrequently and under less severe duty will naturally require less attention. The frequency of inspection will be largely determined by experience.

"Ten points to check for proper maintenance are:

"1. Before making any adjustment to an oil circuit breaker make sure that all lines leading to it are electrically dead.

"2. Be sure the breaker frame is grounded.

"3. Do not operate the breaker excessively by the electrical operating mechanism when the oil tank is removed.

"4. Examine all contacts frequently, especially after severe short circuits, to see that contacts are properly aligned. Dress or replace contacts that are burned.

"5. After making adjustments test the breaker by hand to make sure that it operates smoothly and correctly.

"6. Inspect the oil regularly and after severe short circuits. If it shows signs of moisture, carbonization or dirt, filter and retest it before replacing it in service. See that the oil level in the tanks is maintained at the proper height.

"7. Remove all oil and thoroughly clean the tanks, tank liners, lift rods and terminal bushings at least once a year.

Engineering Design

—Creator of America's Mechanized Might

In war, as well as in peace, the design engineer is the vital link between the inventive mind and the mass-production reality

IT is gratifying and interesting to note that reports of new "secret weapons" not only have reversed their course during the past few months . . . they also have increased in frequency. Once they filled us with dread and misgiving. Today the enemy does the worrying.

Word about the latest new Army weapon reached us as this was being written . . . a 2½ ton truck that performs on water as well as on land with equal efficiency. "The Duck", resembling an overgrown amphibious jeep, is particularly suited to landing operations where docks are lacking. Loaded with 20 fully equipped soldiers or their equivalent in supplies, its propeller runs it ashore. It climbs the beach on its six-wheel drive and continues the trip on land.

This important addition to our "second-front" fighting equipment, coming so closely on the heels of the now famous tank-killing "Bazooka", is one of many history making contributions of American design engineers — the men who transform nebulous ideas into practical realities — the men who make our war machines superior to those of our enemies.

Invasion and eventual victory became a certainty as soon as America's design engineers threw their full effort into the war against aggression. Adapting intricate ordnance designs to mass production, these men developed weapons such as the M-10 destroyer of Rommel's tanks and brought out the new fighting planes and bombers that have won the air superiority that has turned the tide against the Axis. Taking ideas and giving them form, selecting the materials of construction, deciding upon the method of fabrication, adapting the electrical and mechanical parts that power the product, specifying the finish that protects and beautifies it . . . these men are the focal point of American production. Their ingenuity has no parallel. Once they put automobiles on a mass production basis and within the reach of all. Today, after less than three years and with little previous experience in armament design,

they have brought America's war weapons to the highest efficiency . . . surpassing Hitler's weapons despite all the vaunted scientific wizardry of the Germans and their ten year start.

At this point it is well to remember that while Germany's military might is traceable to its superiority in armament, many of the basic technological discoveries (including the airplane and the submarine) are the products of American genius. The Germans always have been aware of the military advantages of technological superiority and have forced its expansion with all their might. They knew that mobility and surprise play a decisive role in modern warfare and their design engineers were kept

busy, with unique intensity, to achieve unprecedented results in fast-moving, hard-hitting fighting equipment. Our own military and industrial engineers did not go into action until it became certain that we would be involved in the conflict. But even before our country actually embarked on its Preparedness Program they were busily engaged in developing the designs of our war equipment. Tanks, planes, guns, ships and hundreds of other apparatus and machines of war were studied. Carefully selected committees of our national engineering societies

were organized under the leadership of the Army Ordnance Department to serve as advisors and consultants in the development of advanced designs of tanks and other motorized equipment of war. The above mentioned "Duck" and the now famous Sherman tank are just two of the many results of these efforts.

After the Preparedness Program had officially been launched and Congress had made its initial appropriation, it was necessary to create the manufacturing blueprints from which the engines of war could be built. Because the designs of the machines of production, as well as the designs of the products themselves, determine the speed and economy with which anything can be manufactured,

This is the thirteenth of a series of editorials appearing monthly in all McGraw-Hill publications, reaching more than one and one-half million readers. They are dedicated to the purpose of telling the part that each industry is playing in the war effort and of informing the public on the magnificent war-production accomplishments of America's industries.

the capacity of our industrial system is dependent, to a considerable extent, upon the ability and ingenuity of American design engineers. Germany's military might was successfully mechanized because Germany, for more than 10 years preceding the war, was riding the wave of a world-wide technological revolution. This revolution was as far-reaching as the advent of the electric motor and the internal combustion engine. It was born of the profusion of inventions and discoveries since the last war. German design engineers took advantage of every one of these.

If we are to defeat our enemies and if we are to continue to play the leading role in the post-war world we must make better use of the new technology than do our enemies. The job is up to American product engineers who already have made tremendous strides in designing the intricate machinery of production and of war equipment. Much remains to be done however.

It has been said that the Germans have not developed one single item that can be classified as basically original, nor are there indications that any so-called "secret weapon" will henceforth be developed by them. Today the Nazis are completely outclassed by the tremendous manpower of engineering brains that is at the disposal of American industry. Although we were faced by the same fundamental problems of shortages in materials, manpower and time, our engineers not only solved these problems quickly and effectively, but they outstripped the enemy by the preponderant weight of talent which we were able to bring to bear upon our problems. As is evidenced by studies of the designs of captured German war equipment, our airplanes are faster, carry heavier loads, have superior protective armor and heavier armament. Our tanks, especially the Shermans, stand unmatched. Our tractor-mounted artillery excels theirs in fighting power. Our automotive vehicles are the envy of the world. Our battleships are supreme. Our signal and detection devices are frustrating all of our enemies' attempts to dominate the seas.

And as we approach the end of the conflict, the pattern of which already has been set, the forces that converted American industry from peace to war-production will again be brought into play, and the product engineer will continue to be the fulcrum. Our post-war industry will grow from his blueprint. Nor will his job be any less urgent, any less responsible, any less sweeping in its effects than were his efforts during the war-preparedness program.

Since the cessation of the manufacture of peace-time goods, many new materials and production techniques have been developed. Plastics, synthetic rubber and magnesium in the field of materials were relatively new and restricted in their uses when war came. So were powder metallurgy, induction heating, electrostatic heating, adhesives for joining metals and compressed resin-impregnated wood. The new possibilities in product design created by the electronic devices and applications developed during the war period virtually stun the imagination and the "atomic revolution"

promises to change the entire pattern of manufacturing operations.

Never before has there been so much speculation about the future as there is today. Looking forward, who can doubt our limitless capacity to continue our industrial world leadership?

While no one can predict developments in product design in the post-war period, certain it is that they will be so vastly different and so far superior to existing designs that they will obsolete most products as we know them today. With engines of vastly superior metals, designed to burn 100 octane gasoline and built to a precision ten times greater than that of pre-war engines, our post-war automobiles will give from 40 to 60 miles to the gallon. Tires will last from forty to fifty thousand miles. The comfort and smoothness with which these cars of tomorrow will glide along are undreamed of today. Polaroid windshields will eliminate the glare of oncoming headlights and the driver will need to give but scant attention to the manipulation of his simplified gear shifts.

According to no less an authority than Igor Sikorsky, we stand on the threshold of a new air age in which the helicopter will contribute to the greatest prosperity we have ever known.

Prophecies are hard to make at a time like this but speedy house building seems to be a certainty in the world of tomorrow. Air conditioning, new methods of heating, humidifying and drying, promise to be necessities in the post-war home. Vacuum sweepers will be much lighter, less noisy and easier to manipulate. Washing-machines will be fully automatic and practically free of noise and vibration. Not only will our homes and most of the furnishings be of radically new design, but so will the factories and machines that produce them.

Only one factor can prevent the fulfillment of the dream of the product designer. His job is not accomplished overnight. To convert sound ideas into production blueprint involves a great deal of time and money. The building of test models is an expensive and tedious procedure. An abundance of seed money is required to perfect the product, to develop mass-production methods and to bring it to fruition as a finished saleable product.

It is the patriotic duty of every industrial leader to hasten these developments so that the material benefits created by them may speed our progress along the road of abundance.



President, McGraw-Hill Publishing Company, Inc.

ATTENTION STRIP MINERS

NATIONAL POWDER CO. HAS
SOLVED YOUR PROBLEM OF
SHOOTING OVERBURDEN
IN STRIP MINES



★
★ Our "Slim-ite" Powder Series (No's 1-2-3) are
★ *specifically designed* for overburdens having
★ any combination of rock, slate, shale or clay
★

★ This series of powders will materially reduce loss in shovel
★ hours due to faulty breakage—and will give you greater yard-
★ age per pound of powder and more coal on cars per shift.

Evidence of the effectiveness of these new Powders is found
in the tangible testimony of Strip Mine Operators themselves.
Though introduced only this year, more than 1,000,000 pounds
of "Slim-ite" Powders have been used in stripping operations.

★ REFER TO OUR ADV. ON PAGE 22 OF COAL MINING CATALOGS

NATIONAL POWDER COMPANY

ELDRED (McKEAN COUNTY) PENNA.

POWDER
NATIONAL
COMPANY
Not living on our
reputation but
building it.

MANUFACTURERS OF HIGH EXPLOSIVES FOR ALL INDUSTRIAL PURPOSES

"8. Thoroughly inspect all bolts and nuts; tighten if necessary. Inspect all pins, links and bearings for excessive wear. Check all cotterpins.

"9. Dielectric tests of the oil should be made every three months to show if it is reasonably good for circuit-breaker work. Samples should not be taken until the oil has remained undisturbed for at least four hours. If testing for indication of water, take the sample from the bottom of the tank. For indication of carbon and after a heavy short circuit, take the sample from the surface of the oil.

"10. Arrange for regular inspection to see that the circuit breaker is in adjustment, the oil of good quality and the complete breaker functions as required."

Industrial Notes

GENERAL ELECTRIC CO., Schenectady, N. Y., has appointed W. A. Mann as assistant manager, Industrial Division, Central District, Chicago. After being graduated from the University of Illinois in 1923 with a B.A. degree in electrical engineering Mr. Mann became associated with G. E.'s turbine department at the Schenectady works.

DELAVAL STEAM TURBINE CO., Trenton, N. J., builder of gears and turbines for marine propulsion, centrifugal pumps, rotary oil pumps and centrifugal compressors, has been granted by the Naval Board for Production Awards a second renewal of the right to fly the Navy "E" flag with two white stars for excellence in production.

IRON & STEEL PRODUCTS, INC., Chicago, announces the following changes in management: Frank Parker, chairman; Albert G. Bladholm, president; John F. Parker, vice president and treasurer; William J. Parker, vice president and secretary; Royal J. Casper, assistant secretary.

ATLAS POWDER CO., Wilmington, Del., has appointed J. C. Costello as manager of the Giant Division sales offices with headquarters at San Francisco, Calif. He succeeds Weston G. Frome, who has become assistant general manager of the explosives department at Wilmington, Del.

WICKWIRE SPENCER STEEL CO. has received its first gold star for its Palmer (Mass.) wire-rope plant from the United States Maritime Commission. In recognition of outstanding production achievement Admiral H. L. Vickery notified the company that it should add a gold star to the Maritime "M" burgee awarded last October and that the "M" badge would be awarded to 325 additional employees besides the 1,500 honored last fall.

WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa., has appointed Herbert G. Dillon as manager of the newly formed mining section of its industrial department. He joined Westinghouse in 1923 soon after graduation from Oklahoma A. & M. From 1933 to 1941 he was sales engineer with General Motors Corp. He moved to the Lee Norse Co.,

serving as sales manager until his appointment by Westinghouse as manager of the mining section.

SULLIVAN MACHINERY CO., Michigan City, Ind., has received the Army-Navy "E" award for production excellence. Rear Admiral H. G. Taylor, U. S. Navy, presented the "E" flag to F. W. Copeland, company president, and Col. Martin H. Ray, U. S. Army, presented token pins to veteran employees.

CATERPILLAR TRACTOR CO., Peoria, Ill., announces that D. A. Robinson has resigned as vice president to become the company's distributor at Salt Lake City, Utah, vice H. D. Landes, retired. Gail E. Spain, who was made a vice president in May, 1942, will succeed Mr. Robinson as administrative vice president of the advertising, sales, export, engine sales, special products and war contracts departments.

E. I. duPONT DE NEMOURS & CO.'s Belin works, Moosic, Pa., received award of an Army-Navy "E" on June 21.

AMERICAN BRAKE SHOE CO., New York City, has appointed John W. DeLind Jr. as director of exports effective July 1. He moves from General Motors Overseas Operation, where for the last 16 years he has been serving in various executive capacities.

GOULD STORAGE BATTERY CORP., Depew, N. Y., has elevated John C. Sykora from sales manager to a vice presidency. He joined the company in 1919. Roy J. Stanton has been appointed motive power sales manager. The company re-

ceived the Army-Navy "E" production award May 29. Miss Dorothy Thompson, radio commentator, was guest speaker.

Roy V. Myers Dies

Roy V. Myers, vice president of the Myers-Whaley Co., Knoxville, Tenn., died June 8 at his home in Los Angeles, Calif. From 1895 to 1906 he was mining engineer of the Dayton Coal & Iron Co., Dayton, Tenn., and went to Knoxville in 1906 to practice as a consulting mining engineer and member of the firm of Myers and Whaley, engineers, and was one of the founders in 1908 of the Myers-Whaley Co., manufacturer of shoveling and loading machines for mine and tunnel work. He retired from active work about 20 years ago.

Trade Literature

AUTOMOTIVE BRAKE LINING—Grizzly Mfg. Co., Paulding, Ohio. Catalog Form 29—BL43 contains recent and complete size and number data on roll and heavy-duty block pressure-molded brake lining as well as multiple coverage segments for both internal and external applications.

COMPRESSED-AIR LINES—Logan Engineering Co., Chicago. Bulletin 543 points out the unnecessarily high maintenance and replacement costs and loss in man-hours resulting from moisture and dirt in compressed-air lines. How the Aridifier, made by this company, cleans and dries

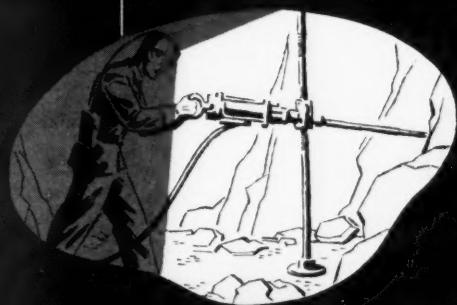


"What do ya' mean, 'wake up, here comes the boss'? I am the boss."



DEEP UNDERGROUND

but he'll never be left in the dark



Keeping faith with the miner in his fight for production victory is the steadfast dependability of the Edison Electric Cap Lamp. Furnishing more effective light, in greater volume, for greater daily tonnage, the Edison Lamp is engineered and built for continuous trouble-free service—to the last specification and the last ounce of material.

Better light makes better miners—and the Edison Lamp lives up to its responsibility of providing better light throughout every shift. Armed with the Edison Lamp and its sturdy companion, M. S. A. Comfo Cap, today's miner is well-protected against underground hazards—while doing an essential job for America.



For outstanding production achievement . . . the Maritime "M" Pennant and Victory Fleet Flag, awarded to M. S. A. by the U. S. Maritime Commission.

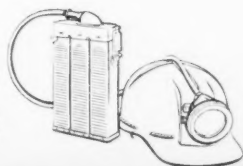


MINE SAFETY APPLIANCES COMPANY
BRADDOCK, THOMAS and MEADE STS., PITTSBURGH, PA.

District Representatives in Principal Cities

IN CANADA

MINE SAFETY APPLIANCES COMPANY OF CANADA, LIMITED
TORONTO . . . MONTREAL . . . CALGARY . . . NEW GLASGOW, N. S.



**EDISON ELECTRIC
CAP LAMPS**

M. S. A. COMFO CAP

compressed air by centrifugal force is graphically shown. How the compact, cast units are placed in the line is shown and complete specifications are given for sizes from $\frac{3}{8}$ to 10 in.

CONVEYOR WEIGH METER—Builders-Providence, Inc., Providence 1, R. I. Bulletin 322 tells how Toledo-Chronoflo automatic conveyor scale can be used for continuously and accurately weighing and/or controlling the flow of dry material in transit on any belt conveyor system. Illustrations show principles of operation and types of installation, which include both direct-reading totalizer and chart recorder.

DUST-ALLAYING AGENT—Johnson-March Corp., New York City. Bulletin 100-M, on Compound M, a "scientifically formulated chemical which, when added in small quantities to water, effectively breaks its surface tension, permitting it to thoroughly 'wet' coal or other dust," lists the properties of a satisfactory wetting agent, describing methods and equipment for its application on equipment, in mines, haulageways, tipples, at dumps and in retail yards.

ELECTRIC BRAKE—Empire Electric Brake Co., Newark, N. J. Bulletin on the Magdraulic electric brake explains construction and operation, telling why only approximately 2 amp. is required to operate it. Engineering drawings give dimensions of three stock sizes as well as approximate torque each delivers. Typical wiring diagram for using this brake on a.c. power is included.

ELECTRODE INDEX—Air Reduction Co., New York City. Electrode comparison chart details the principal A.W.S. and A.S.T.M. electrode classifications and indicates which electrodes produced by 20 leading manufacturers meet the different requirements.

EXCAVATOR MAINTENANCE—Bucyrus-Erie Co., South Milwaukee, Wis. Booklet, "Ideas to Help You Keep Your Present Excavators Working and Doing More to Win the War," gives practical, experience-tested suggestions to owners of shovels, cranes and draglines on how to maintain maximum excavator production.

FITTING PISTONS TO RECONDITIONED CYLINDERS—Instructions for fitting pistons to reconditioned cylinders have been issued by the Office of Defense Transportation in a printed manual prepared by the Society of Automotive Engineers. The manual covers all the factors involved; re-boring gray iron, alloy and sleeved blocks (hard sleeves); installing the various types of aluminum and cast-iron pistons; oil control; installing rings; cutting down standard-size pistons to fit; salvaging used pistons; ring grooves, depths and fits, including formulas for both aluminum and cast-iron; piston surface treatment; wrist pins; insertion of both wet and dry sleeves; and limits and tolerances for all parts of the operation. Copies of the manual may be obtained without charge from the Office of Defense Transportation, Wash-

ington, D. C., or from field offices of ODT and the Office of War Information.

INSULATION—Sterling Varnish Co., Haysville, Pa. Bulletin 143, entitled "Thermobonds, the New Insulation," describes ten insulating mediums that have been thoroughly tested in the applications for which they have been produced by subjecting them to excessive heat, heavy overloads and atmospheres crowded with acid or alkali fumes and abrasive materials. The Thermobonds are for application to such units as high-speed armatures, high cycle drill and grinder motors, heavy-duty motors and transformers, and marine-engine magneto coils.

MANGANESE STEEL—American Manganese Steel Division, American Brake Shoe Co., Chicago Heights, Ill. Bulletin 543-G tells what manganese steel is, describes its properties and sets forth in word and picture its suitability for a variety of applications.

PIPE TEMPLATES—Air Reduction Co., New York City. Bulletin entitled "Pipe Templates for Welded Fittings" tells how to fabricate fittings for welded piping installations by means of flame cutting and welding. It shows how to draw up and use paper templates for flame-cutting pipe to assure accurate, close-fitting connections. The templates and procedures described are intended primarily for use where special fittings are required or where stock welded fittings may not be available when needed.

PREPARING METAL SURFACES FOR METALLIZING—Metallizing Co. of America, Chicago. Bulletin describes new Mogul electric bonder for preparing hardened metal surfaces for metallizing. Operates on 220-volt 60-cycle line. Patented air-cooled electrode holder permits high-speed bonding without fear of overheating, prehardening or distortion. Developed originally to prepare heat-treated surfaces for metallizing, it is said to work equally well on all metals.

PLANNING BOX LUNCHES—Westinghouse Electric & Mfg. Co., Mansfield, Ohio. Booklet, "How to Pack Lunch Boxes for War Workers," prepared by Mrs. Julia Kiene, director of Westinghouse Home Economics Institute, aims to simplify the planning and packing of husky, healthful box lunches that will please lunchers and measure up to all the rules of good nutrition. Practical pointers are given on the right foods to use, night-before short cuts and how to keep a lunch box from becoming a bore. There are lunch-box menus for every day of the month and more than three-score recipes, including 26 different sandwich fillings and spreads.

SHAKER CONVEYORS—Goodman Mfg. Co., Chicago. Bulletin CC-424 details the features and advantages of the Goodman shaker conveyor system, with succinct descriptions and views of the units and accessory equipment at work.

SURFACE CONDENSERS—Ingersoll-Rand Co., New York City. Bulletin Form 9327

discusses structural and design features; steam penetration; air-removal equipment; marine condensers; cross-flow condensers; essentials of a condenser plant; condenser accessories and pumping equipment, etc.

SYNTHETIC RUBBER—B. F. Goodrich Co., Akron, Ohio. Revised edition of Catalog Section 8000, on "The Properties of Ameripol D," oil- and heat-resisting synthetic rubber used in many specialized industrial applications, discusses its properties, including its resistance to various substances which are enemies of natural rubber, hardness, tensile strength, elongation, weight, color, odor and taste, elasticity and permanent set, resistance to tear, abrasion, flexing, oils and solvents and heat. The properties of the various compounds of Ameripol D are listed in tabular form, including a rough guide indicating the services where use of synthetic rubber is practicable.

TEACHING FIRE FIGHTING—Walter Kidde & Co., Inc., 140 Cedar St., New York City, 6. Manual entitled "How to Teach Fire Fighting" is designed to aid industrial executives in instructing employees in fire-extinguishing techniques. It describes the classification of various types of fires, the kind of extinguisher best suited to each and the methods of setting up demonstrations to teach the proper use of each type of extinguisher. Intelligent and regularly repeated training of workers in first-aid fire fighting is emphasized as one of the most necessary and profitable methods of counterattacking our No. 1 saboteur. The booklet is offered without cost to any plant requesting it.

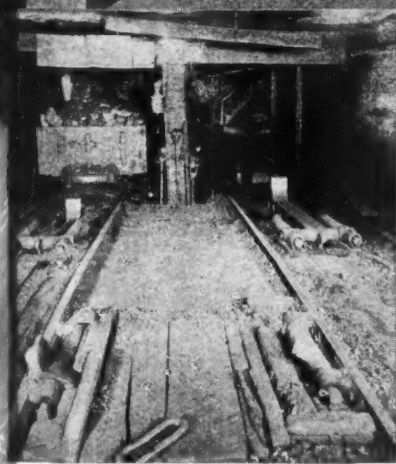
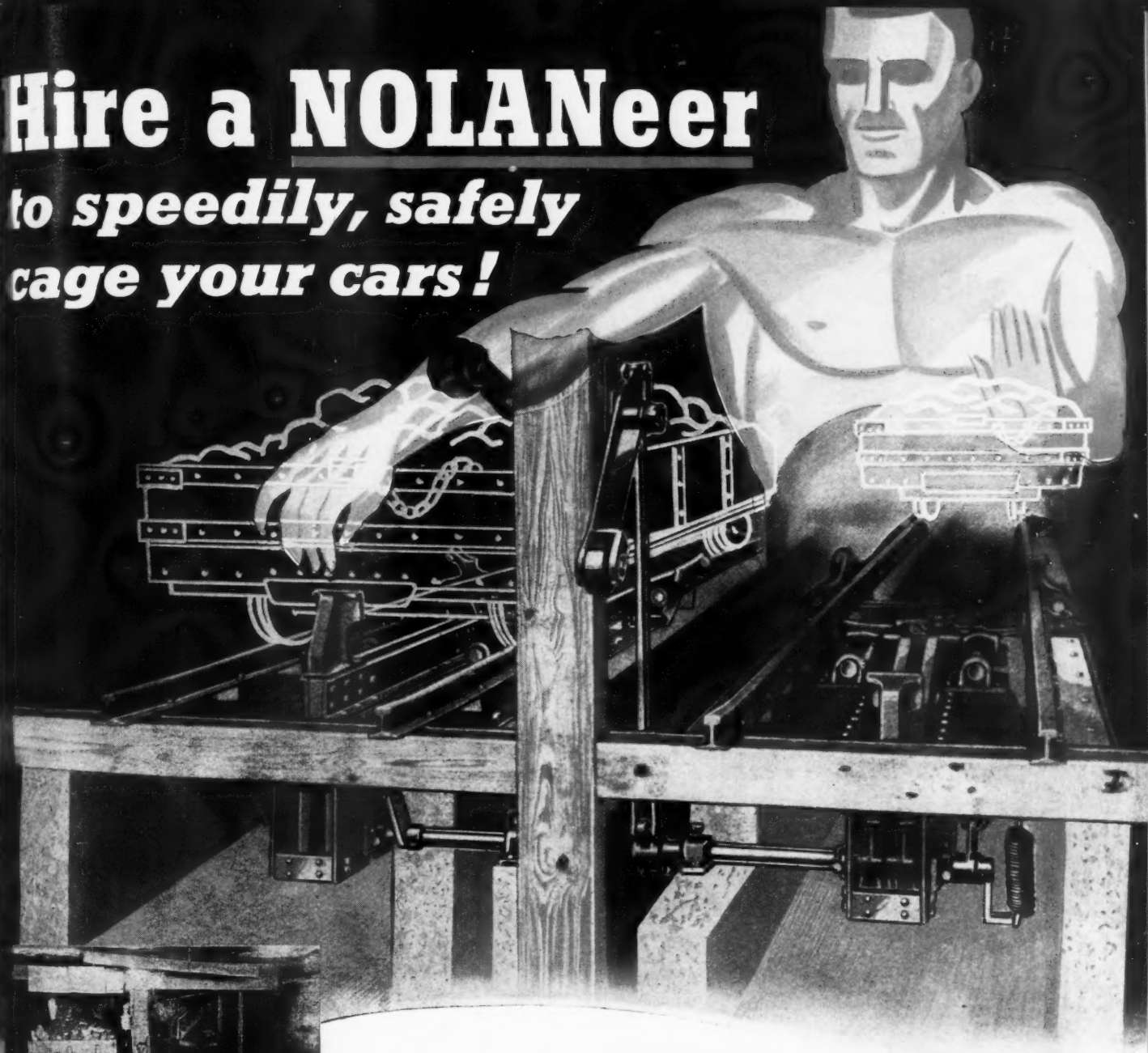
VIBRATING EQUIPMENT—Jeffrey Mfg. Co., Columbus, Ohio. Catalog 750 covers the complete line of Jeffrey-Traylor electric vibrating equipment designed to provide the ultimate in operating economy, flexibility and dependability in feeding, conveying, cooling, drying, packing, screening and many special applications.

WATER SOFTENING—Cochrane Corp., Philadelphia, Pa. Reprint 25, "Operation of Hot Process Softener at 50 Lb. Gage Improves Performance and Saves Chemicals," illustrates the effectiveness of high temperatures in reducing hardness with lime and soda treatment with saving in both lime and soda ash, and describes what is believed to be the only hot-process water softener operating at this high temperature utilizing lime and soda-ash treatment on two-stage softening period.

WHITEPRINTS—Ozalid Products Division, General Aniline & Film Corp., Johnson City, N. Y. Folder illustrates how an Ozalid print with maroon lines on a white background stands up in comparison with a blueprint under actual shop conditions; points out that the maroon line shows even when covered with grease or dirt stains. It contains samples of Ozalid's complete line of new sensitized materials. The Ozalid dry developing process is completely described and the white-print machines are pictured.

Hire a **NOLANEER**

*to speedily, safely
cage your cars!*



Use Patented Nolan Automatic Cushioned Bumper Stop Cagers

● The NOLANEER is the spirit of precision and control built into Nolan Mine Car Cagers, for shaft bottom and intermediate levels.

He represents the engineering skill assured you by Nolan patents and improvements, and the service built into Nolan units by the most experienced mechanics in the business.

Nolan Cagers are working in hundreds of mines throughout the country, rapidly and automatically handling mine cars to hoisting cages without damage to car wheels, journals and axles. And these cagers work with the same care and efficiency in dump operations.

War demands for coal in industry and home require smooth-running, trouble-free, high-speed production at every point in your mine. Don't let bottlenecks at shaft bottoms or dump points handicap your output. Nolan Car Caging Equipment easily handles loaded cars with clock-like precision, hour after hour, year after year, without delay or waste motion.

Write for complete information on Nolan Rotary or Gravity Car Dumpers, Trip Feeders, Car Hauls, Automatic Cagers, Platform and Self-Dumping Cages, and Cushioned Car Stops.



THE MINING SAFETY DEVICE CO.

Strip Mining Is 50% to 90% Earth Moving!

The cost per ton of mined coal depends on the cost of stripping overburden to get at the coal. The more earth you have to move the higher the cost per ton of coal. Baker Bulldozers and Grade-builders keep stripping costs at a minimum. Where the cover is thin, they do the stripping single-handed—where shovels or draglines are used, they help in bucket-loading, prevent slides, scale off bone, level slack piles and do the preliminary work so shovels can move in. Scores of mines use one or more units. Operators like the Baker's fast, positive, hydraulic blade control. It's simple, direct. No cumbersome superstructure, no cable to wear or hoist drum brake lining to replace. Low maintenance costs result in lower stripping costs. Put Bakers to work and watch your stripping costs go down.

THE BAKER MFG. CO.

"If It Concerns Victory, It Concerns Us"

514 Stanford Avenue, Springfield, Ill.



Bakers
Move Earth
Faster and Cheaper



Baker Bulldozer on Allis-Chalmers tractor building road to stripping operations, Miners Mills, Pa.

BAKER

The Modern Tractor Equipment Line
for
**EARTH MOVING
LEVELING AND GRADE BUILDING
SNOW REMOVAL
ROAD MAINTENANCE**

TIMELY OPERATING IDEAS



126-Ft. Hole Through Pillar Made With Hand Drill

The details of drilling a 2½- to 2¼-in.-diameter hole through a coal pillar 120 to 126 ft. thick to release a body of water impounded in an old strip pit so that it could be run to a sump for disposal have been submitted to *Coal Age* by W. H. Luxton, Linton, Ind. The job was done some two years ago, and the drill was an ordinary hand-cranked post drill, says Mr. Luxton. The time required was approximately three days.

Aside from the drill post, the equipment consisted of an ordinary auger bit 18 in. or so long, a 30- to 36-in. thread bar, two special connecting sections and the necessary 1-in. prospecting drill rods. The first special section, for use on the end of the thread bar, consisted of an old piece of thread bar fitted into a short length of 1-in. drill rod, the whole having a length of 12 in. The second special section, 2½ ft. long, comprised a section of drill rod with coupling on one end and socket for accommodating the bit on the other.

The drilling was done in steps of 2½ ft., using 2½-, 5-, 10- and 20-ft. lengths of drill rods, or pipe, fitted with the usual screw-type couplings. In such work, Mr. Luxton points out, it is necessary to have good tight joints free from lash, meaning that the sockets should be in good shape and square. It also is necessary to make sure that the locking wires are in place in the thread bar and coupling holes to prevent loss of drill rods and bits in the

hole. With tight joints and a hole so much larger than the rods, the wear on joints is not more than that normally to be expected.

The diameter of the hole, says Mr. Luxton, could be even greater, not only because it later is useful in its task of draining water accumulations, either with or without casing, but because it would facilitate drilling. A larger hole makes it easier for the water to flush the cuttings out. To clean the hole, he remarks, it is only necessary to work the rods back and forth a few times to loosen any cuttings that might have a tendency to stick.

Holes of this type, Mr. Luxton also states, could be useful in removing water accumulations by inserting a pipe and pumping directly from the water body to the surface. Among other things, the water would be clearer and less acid, reducing wear and corrosion of pumps and lines.

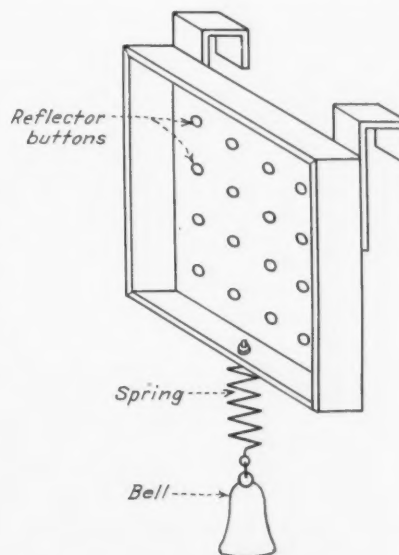
Welding Rails Ball to Ball Makes Strong Crossbars

For crossbar service, light rails are welded together ball to ball at the Oliver mine of the Oliver Coal Co., near Somerset, Colo. Some of these double-rail welded bars are shown in service in the accompanying illustration. As can be seen, the welds are not continuous. Instead, they consist of a series of short beads at regular intervals on both sides sufficient to hold the rails together under normal bending stresses. A major feature of this prac-

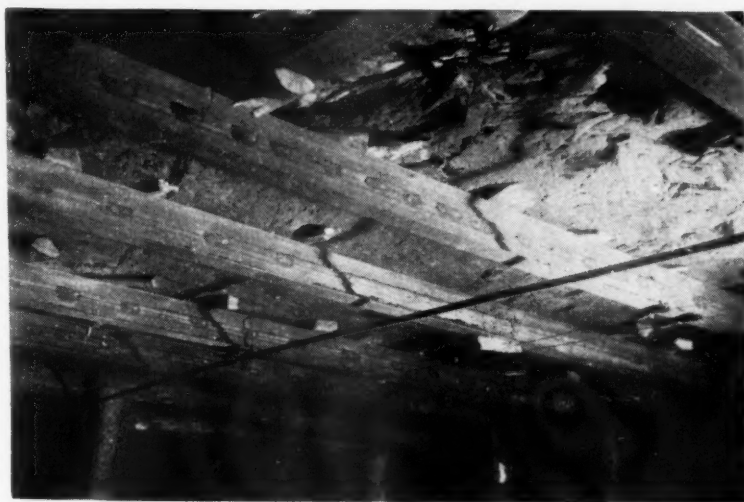
tice is a substantial increase in load-carrying ability over what two single rails installed in the conventional manner could carry.

Reflector Buttons and Bell Make Trip Signal

As a signal both in pushing and pulling trips, P. C. Ziemke, Milwaukee, Wis., offers the device sketched in the accompanying illustration. It provides both a visible and audible signal of trip movement, and at the operation in question replaced several others which were both complicated and expensive. After trying the other devices, experiments were begun with a spring-mounted bell on the last car of the trip. This proved reasonably successful, and further development was carried on with a reflector type of



This signal includes both reflector buttons and a bell.



How light rails are welded together ball to ball to make strong crossbars

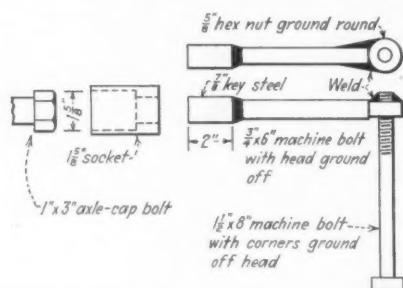
signal, using "Cataphote" reflector buttons. The combination of bell, reflector buttons and safety holes in the rib, with green lights to show their position, it is now felt, has reduced traffic hazards to the minimum.

The reflector unit is made of steel 10x10 in. and 2½ in. deep. The depth protects the buttons. Hooks on the back permit hanging the signal on the car. The Swiss cow-bell type gong, measuring some 5 in. across the throat, is suspended on a spring wound on a 2-in. mandrel on

the shop lathe, using No. 9 brass spring wire. Length of the spring is 4 in., and it is bolted to the lower side of the reflector cabinet and wired to the eye on the top of the bell. Transferring the signal from trip to trip, of course, is but the matter of a moment.

Axle-Cap Bolts Replaced Easily With Special Starting Tool

"All electricians and shop men know well what a tiresome job it is, when re-trucking or putting axle linings in 10-, 13- and 15-ton Jeffrey locomotives, to hold the axle cap in place with one hand and put the bolt in with the other under the strain of holding the cap," writes G.



Details of tool for starting axle-cap bolts.

O. Crawford, electrician, New River Co., Summerlee, W. Va., in describing a special tool for this purpose. "In most cases, about three or four turns with the hand is the limit. Under the strain, also, it is tiresome where the bolt is too tight for the hand and too loose for the big wrench.

"Most all shops have the Jeffrey sockets or the snap-on sets. In this case, take the 1 1/8-in. socket, put it on the bolt that is already started and insert the special tool into the socket. The bolt then can be run up quickly. Repeat this action until all the bolts are run up, lay the tool aside,

take up the big handle or ratchet and set the bolts. It takes less time with this tool than trying to run a bolt up with one hand and a heavy wrench."

Tools of Cable Repair Shop Set on Central Table

Last year, as a conservation and safety measure, the New River Co., operating in southern West Virginia, established a central vulcanizing shop for repairing, splicing and rebuilding the 60,000 odd feet of conveyor and trailing cables used in its mines. To insure room for the work, this shop was installed in a corner of a material storage building at Kilsyth mine, in the town of this same name, adjoining Mt. Hope, company operating and administrative headquarters and site of the main shop and warehouse.

As shown in the illustration, all items of equipment for cable servicing are mounted on one table in the center of the floor space allotted. The items include a splicing vise, two Mines Equipment Co. steam vulcanizers and a Westinghouse safety switch with plugging receptacles for the two vulcanizers. The smaller unit, Type 1, takes 2,000 watts and the larger, Type 5, requires 3,860 watts. On the table, in a row in front of the safety switch, are the molds for various sizes and types of cables.

Cables used range from single to five-conductor and from size No. 14 for conveyor control to size No. 1 for power supply. Considerable three-conductor is in use to comply with State mining department requirements for a safety ground. Gathering locomotives are equipped with 400-ft. cables and mining machines with 300-ft. Underground equipment in seven of the mines operates on 550 volts and in the remaining five on 275. A number of conveyors are in use and to the present all are driven by d.c. power.

Conductors of the larger cables are joined with Canton or Newberry solder-

Short Cuts

If you are in charge of equipment maintenance or are responsible for devising new schemes and methods of operation you can save time by short cuts. If you meet a problem and seek a solution from your head it may be tedious and time-consuming. The worked-out solution may be found in these pages. Incidentally, if you have any original ideas on operating problems, send them in—accompanied by sketch or photograph if it will make them clearer. Accepted ideas are paid for at the minimum rate of \$5 each on publication.

less splicers closed by hammering between dies. Normally two men work in the cable shop and as a rule the two vulcanizers handle the "cooking" about as fast as the men can prepare the splices. Referring again to the illustration, the right foreground shows two Miller three-conductor plugs ready to be spliced to No. 4 three-conductor cable and just back of them is a coil of No. 2 duplex machine cable. The small cardboard box at the left is the receptacle for saving the scraps of rubber, now said to be more important to us than gold.

Standards of safety and efficiency in mine operation require that a trailing cable be removed and sent to the Kilsyth vulcanizing shop when the number of temporary splices reaches six or when the total of temporary splices and damaged places reaches that number.

Lathe Mounted on Headframe To Regroove Sheave Wheels

Considerable time was saved in regrooving worn sheave wheels, according to an account submitted by P. C. Ziemke, Milwaukee, Wis., by hoisting a lathe on the headframe and doing the work without dismantling the wheels. At the operation in question, the ropes come up over the main wheels and then run horizontally back to idler wheels before slanting down to the hoist. The lathe was set up under the rope on each side to take care of the regrooving. Diameter of the wheels was 12 ft.

Prior to the actual regrooving operation, the headframe crane, used to install or replace sheaves, was used to hoist an old 18-in. South Bend lathe to the platform. To keep it in place, it was bolted to the decking through holes burned at the proper spots. The outer legs of the lathe were set on a 3-in. plank to gain some tilt and thus assist in the cutting operation.

The cut was planned to restore the groove to its original width, but of course was deeper to match the wear occasioned by the rope travel. The regrooving was especially desirable because of the necessity for replacing the old ropes, both be-



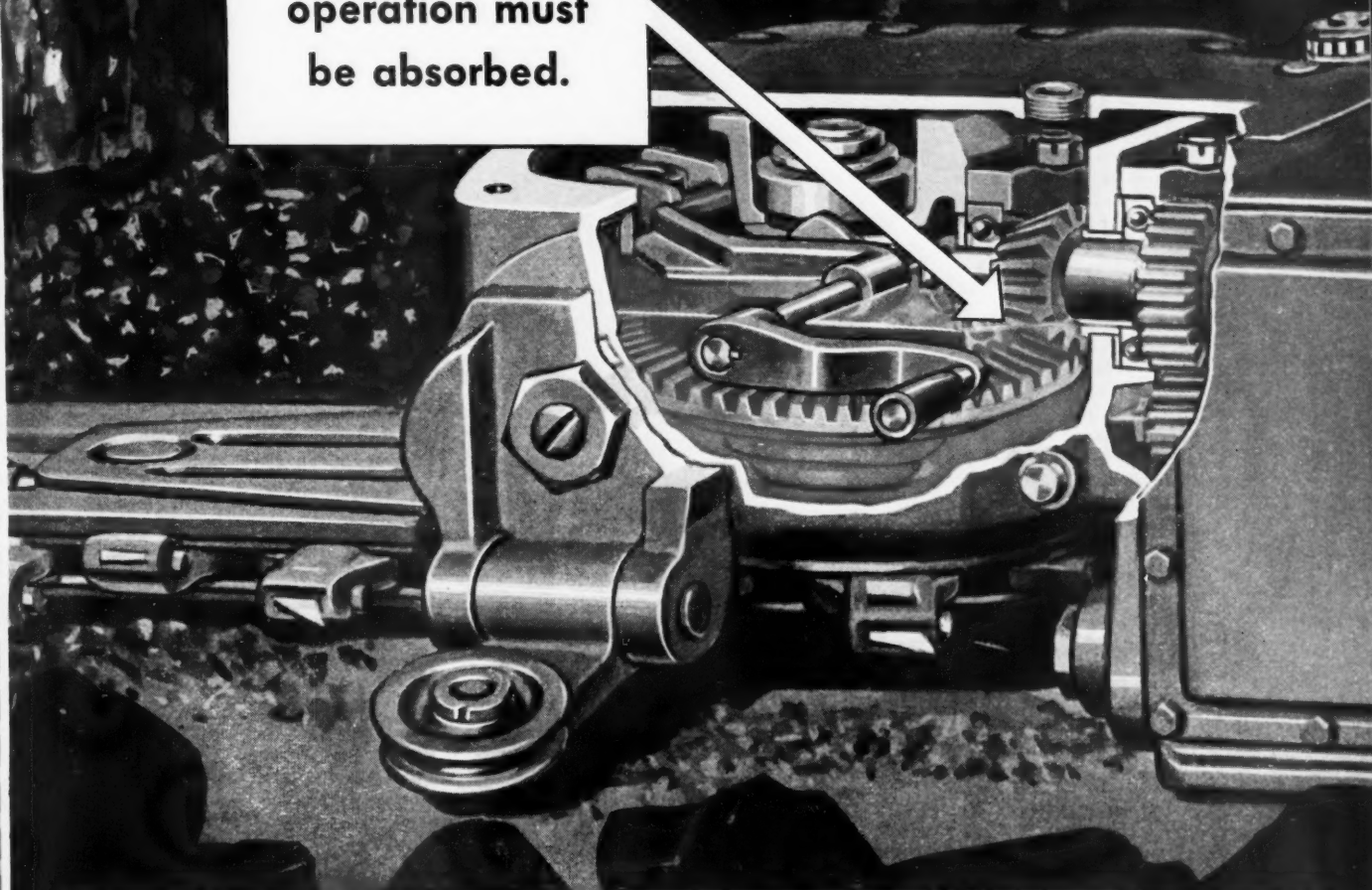
All equipment on one table in the center of the room. Bernard Lee Burgess tapes a splice and C. C. Bullard, master mechanic, notes a maintenance report.

HOW TO SOLVE

Operating Problems

with *Correct
Lubrication*

Right here the
continuous shock
of the cutting
operation must
be absorbed.



Just an "Oil Bath" Isn't Enough

PROBLEM: Coal cutter gears take a severe pounding. Even though the gears are flooded with oil, shock loads may rupture the fluid oil film. This would leave only a *microscopic* film to protect the gear teeth from disastrous wear. It takes a *special kind* of oil to provide effective lubrication.

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cause of wear and because they were too short to reach newly developed stations. These new ropes naturally were larger in cross-section than the old.

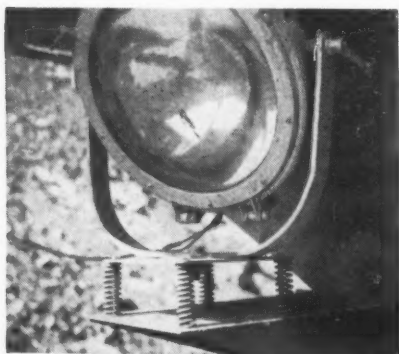
While the lathe was being hoisted and fixed in place, a temporary telephone circuit was run up from the nearest instrument communication between the machinist and the hoisting engineer. Each man was provided with a pair of ear-phones and a breast transmitter to leave their hands free. At 5 p. m., after completion of the regular hoisting schedule, the first skip was slowly started from the bottom (3,000 ft. down), while the machinist adjusted his lathe tool and took a few preliminary cuts to get the "feel" of the job. Finding conditions right, he called for speed and from there on the work went along without a hitch. Occasional stops were made to change tools and gage the groove. Two three-hour tricks on separate evenings served to complete the job.

The lathe required no power, since its function was to serve as a tool holder and provide cross feed and lateral travel. Ordinary tool-steel tools were employed, but later modern cutting materials can function with increased effectiveness. Several large operators, incidentally, also have developed a technique of regrooving by means of pedestal-type grinders with self-contained motors.

When regrooving smaller sheaves around the mine, Mr. Ziemke also observes, the third cut was followed by lagging the grooves with maple blocks. These were cut by a local sash-and-door factory to drive-fit measurements. A fully lagged sheave was given two coats of pine tar, and sometimes creosote, to expand the wood fibers and counteract the tendency of centrifugal force to throw the lagging out. Such treatment also preserved the wood. The lagged wheels rendered good service, were easy on the ropes and required no further cutting for groove correction, although the lagging needed to be replaced from time to time.

Reducing Flood-Lamp Breakage With Coiled Springs

The six floodlights installed on the 950-B Bucyrus-Erie stripping shovel at the Fiatt mine of Truax-Traer Coal Co., Canton, Ill., consisting of four 500-watt



Spring mounting lengthens lamp life.

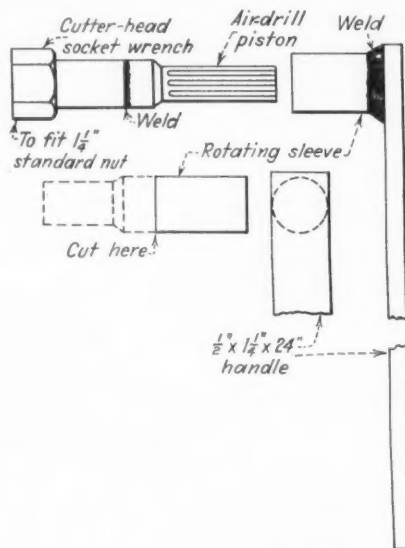
and two 1,000-watt lamps, are each mounted on a subbase carrying four coiled springs on which the floodlamp rests. This arrangement is clearly shown in the illustration.

This mounting, according to J. W. Bullington, pit superintendent, eliminates much vibration and shock, resulting in a considerable yearly saving in lamp replacements.

Shop-Made Wrench Facilitates Replacing Hanger Springs

"Electricians and shop men very often run into a puzzle when replacing broken suspension hanger springs on the 10- and 13-ton Jeffrey locomotives," states E. C. Hitchcock, electrician, New River Co., Summerlee, W. Va., in offering a shop-made wrench for that purpose, made from scrap parts.

The wrench is constructed by taking

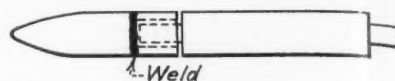


Wrench construction details.

a standard Goodman cutter-head socket wrench and welding onto it the piston from a Sullivan air drill. Next, the unneeded part of the air-drill rotating sleeve is cut off, and the remainder is welded to a long handle, as shown in the illustration. The rotating sleeve fits over the piston and permits turning the cutter-head socket wrench. With this tool, "the nuts on the suspension hangers can be taken off in half the time required with other wrenches."

Hollow-Ended Drift Punch Guides Shoulder Pin

Much time may be saved and unprintable words avoided if special tools are made to handle certain maintenance jobs. Take inserting a shoulder pin in the brake band of a Jeffrey 29D arcwall cutting machine when the band has been sprung out of normal position. Peter J. Bogus, Brownsville, Pa., made the special tool shown in the sketch for this job.



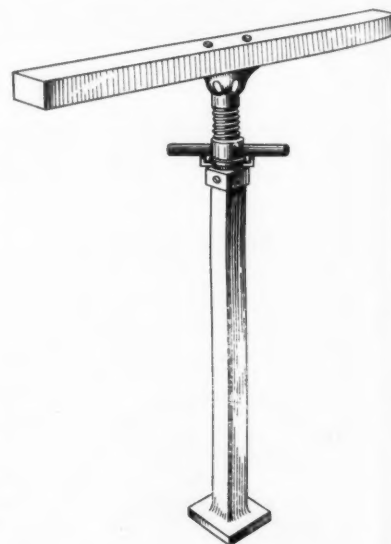
Guide at left; shoulder pin at right.

The tool simply is a tapered-end punch to guide the pin and prevent the shoulder from catching. Mr. Bogus mentions that it can be made in a lathe but the one he shows he made himself with a welder and emery wheel. To a short section cut from a bolt he welded a 1/2-in. pipe nipple, then ground it to the same diameter as the shoulder pin. The end of the bolt also was ground to a taper with round point.

Caps Attached to Mine Jacks Save Labor and Accidents

Disadvantages have the habit of showing up where unexpected but advantages also appear once in a while in the same way. The latter is true with regard to cap pieces permanently attached to screw-type mine-roof jacks in the Blaine (Ohio) mine of the Lorain Coal & Dock Co. The accompanying drawing shows a Simplex jack with a 3x5x24-in. wooden cap piece fastened to the top plate with two 1/2-in. bolts.

As explained by E. G. Schell, formerly superintendent of Blaine mine but now general superintendent of that mine and other properties of the Lorain Coal & Dock Co. in the Pittsburgh No. 8 field, cap pieces were bolted on so that face men would not have to waste time hunting for them when needed. Experience with the method soon revealed a far greater advantage—the safety and ease with which one man can set a jack and cap piece as compared with setting the two separate, which usually calls for two men. Blaine mine (3,000 tons per day) is in the Pittsburgh No. 8 seam, 66 in. thick, and is worked with Joy machines loading into rubber-tired shuttle cars.



Bolted to the jack, the cap piece always is available.



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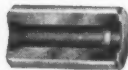
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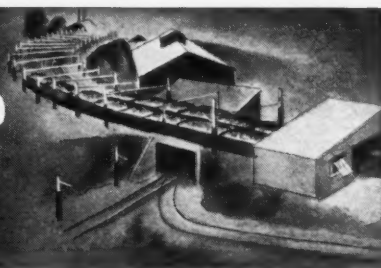
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COAL

COAL AGE NEWS ROUND-UP



Anti-Strike Bill Becomes Law June 25 When Congress Overrides Veto

OVERRIDING the President's veto within two hours after its receipt, Congress passed the Connally-Smith bill June 25, which immediately became the "War Labor Disputes Act" and the law of the land. The measure had gone to the President June 14, after being passed by both branches of Congress June 12. Portending a veto, the President announced June 23 that he would ask Congress to raise the age limit for non-combat military service from 45 to 65 years to cope with strikes in plants, mines or other establishments owned by the government or in its custody.

Sec. 3 of the act gives statutory authority to the President to seize war facilities in case of a strike, threatened strike or other labor disturbance that might interrupt production. The section provides, however, for return of such facility to its owners as soon as practicable, "but in no event more than 60 days after the restoration of the productive efficiency thereof prevailing prior to the taking possession thereof." Also, it provides that no facility shall be seized after the President proclaims a cessation of hostilities or after the expiration of the act, which is fixed at six months after the proclaimed end of hostilities.

Secs. 4 and 5 provide for maintaining existing terms and conditions of employment, except as directed by the National War Labor Board.

Sec. 6 makes it a criminal offense (up to one year imprisonment, a fine of \$5,000, or both) to instigate, direct or aid a strike in a government-operated plant or mine.

Sec. 7 gives the National War Labor Board statutory authority and defines its powers. Under this section, the Board receives power to summon parties to a labor dispute before it for a settlement, to decide the dispute, to subpoena witnesses and documents when necessary and to apply to federal courts for enforcement of such subpoenas. The board, however, has no powers over any matter within the purview of the Railway Labor Act.

Sec. 8 requires notice from employees of a war contractor of a dispute which threatens to interrupt production. For 30 days thereafter, employer and employee must continue work under the prevailing terms and conditions. On the 30th day after notice, provided the dispute has not been settled, the War Labor Board is directed to take a secret ballot to deter-

mine if the employees will permit such interruption. These provisions, however, do not apply to any facility which has been taken over by the government. Failure of any person to comply with the provisions of the section makes him liable for damages.

Sec. 9 forbids political contributions by labor organizations for the period of the war.

Approving Secs. 1 to 7 and terming Sec. 9 irrelevant, President Roosevelt vetoed the measure on the strength of Sec. 8, which he declared ignored completely labor's "no-strike" pledge and "provides, in effect, for strike notices and strike ballots. Far from discouraging strikes, these provisions would stimulate labor unrest and give government sanction to strike agitations."

As an alternative, the President declared that "I intend to use the powers of government to prevent the interruption of war production by strikes. I shall approve legislation that will truly strengthen the hands of government in dealing with such strikes, and will prevent the defiance of

the National War Labor Board's decisions.

"I recommend that the Selective Service Act be amended so that persons may be inducted into non-combat military service up to the age of 65 years. This will enable us to induct into military service all persons who engage in strikes or stoppages or other interruptions of work in plants in the possession of the United States. This direct approach is necessary to insure the continuity of war work. The only alternative would be to extend the principle of selective service and make it universal in character."

Following passage of the act, which was accompanied by thrusts at what was called the President's intention of making the army into a corrective institution, both William Green and Philip Murray, A. F. of L. and C.I.O., respectively, pledged that the affairs of their unions would be conducted so that the law never would be needed. No such pledge was received from John L. Lewis, and opinion seemed to be that he could not be touched for past stoppages, although it was felt that if locals and local officials persisted in remaining away from work, the law might apply to them. It was, however, expected to provide penalties for officials and others if any strike orders were issued in the future.

Strengthening of Government Operation Discussed by Ickes and Operators

INCREASED government control of the operation of the coal mines of the country was under consideration at the end of June as a result of John L. Lewis' controversy with the Appalachian operators and the War Labor Board. With Lewis taking the stand in ordering the miners back for the third time that they were working for the government and that the work resumption would be terminated automatically if the mines were turned back to the owners, Harold L. Ickes and Interior Department officials immediately began consideration of plans for tighter control over operations.

News of this move prompted a request that operators be permitted to discuss the question in advance. This request also stated that "the bituminous coal industry in cooperation with you has achieved an unparalleled war record and has every confidence that you will not permit it to be punished or the national coal supply impaired in order to satisfy the selfish ambitions of others who are in violation of well-established government policies."

Wiring operators in both the anthracite and bituminous fields for a conference, Secretary Ickes on June 24 also stated that the government intends to take a stronger hold on the mines and may be forced to ration coal this winter because of stoppages and other production interruptions. The text of the wire is as follows:

"Developments in the controversy between the mine workers and the operators, which is under the jurisdiction of the War Labor Board, indicate that the government will be compelled to continue custody and operation of the mines for a considerable period of time. I still hope that the controversy may be speedily settled so that private operation of the mines may be resumed under conditions which will not involve danger of interruption of production. But in the present circumstances it is essential to protect the government's interest in the operation of the mines that I undertake active participation in the supervision of management and operation of the mines. I am calling a meeting to be held in Room 5160,

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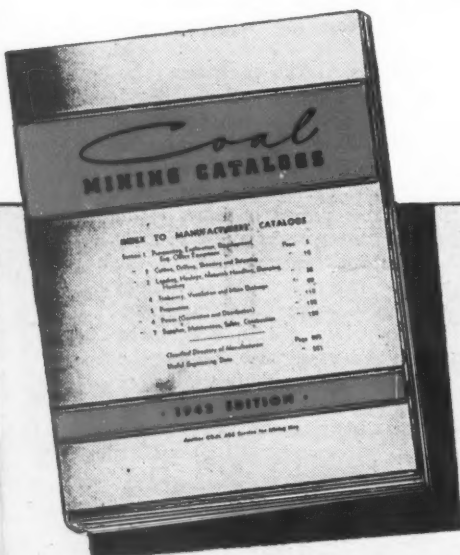
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Interior Department, at 10:30 Friday morning, June 25, of the principal owners and operators of such mining properties in order to take stock of the situation and to hear such suggestions as may be offered. You are invited to attend that conference in person. Proxies, substitutes or representatives are not expected."

Representing the Interior Department and the Solid Fuels Administration at the meeting were Secretary Ickes, Undersecretary Fortas, Assistant secretary Strauss, Deputy Solid Fuels Administrator Gray and Associate Deputy Thomas.

Operators in attendance were: O. L. Alexander, Pocahontas Fuel Co.; Charles G. Berwind, Berwind-White Coal Mining Co.; D. W. Buchanan, Old Ben Coal Corp.; L. C. Campbell, Koppers Coal Division; J. W. Carter, Carter Coal Co.; Heath S. Clark, Rochester & Pittsburgh Coal Co.; H. T. DeBardeleben, DeBardeleben Coal Corp.; C. C. Dickinson, Dickinson Fuel Co.; E. M. Douthat, Sinclair Coal Co.; B. F. Fairless, Carnegie-Illinois Steel Co.; H. L. Findlay, Youghiogheny & Ohio Coal Co.; J. D. Francis, Island Creek Coal Co.; L. Ebersole Gaines, New River Co.; Charles F. Huber, Glen Alden Coal Co.; R. L. Ireland Jr., Hanna Coal Co.; M. L. Jacobs, Industrial Collieries Corp.; R. E. Jamison, Jamison Coal & Coke Co.; Forney Johnston, Alabama; R. H. Knode, General Coal Co.; H. B. Lee, Maumee Collieries Co.; J. D. Mahan, Bethlehem Steel Co.; E. C. Mahan, Southern Coal & Coke Co.; Eugene McAuliffe, Union Pacific Coal Co.; Fred S. McConnell, Enos Coal Mining Co.; J. B. Morrow, Pittsburgh Coal Co.; Harry M. Moses, H. C. Frick Coke Co.; Charles O'Neill, United Eastern Coal Sales Corp.; T. F. Patton; George W. Reed, Peabody Coal Co.; Walter R. Robison; R. H. Sherwood, Central Indiana Coal Co.; K. A. Spencer, Pittsburg & Midway Coal Mining Co.; R. E. Taggart, Philadelphia & Reading Coal & Iron Co.; J. P. Williams Jr., Koppers Co.; Ezra Van Horn, Ohio; and E. B. Winning, Republic Steel Co.

Talks Highly Successful

A long statement was presented by Mr. Ickes at the meeting, after which the operators caucused and appointed an eight-man committee to continue the discussions. Members of this committee are Messrs. Clark, Francis, Morrow, McAuliffe, Robison, Moses, Williams and Dickinson. A spokesman for Mr. Ickes reported June 26 that the talks were "highly successful" and that the eight committeemen accepted the government operation arrangement as essential at the moment and would cooperate in every way for maximum production. In the course of the proceedings, Mr. Ickes was reported to have made it clear that he did not want to keep the mines any longer than was necessary and that it was to everybody's interest to get the mines on a maximum-production basis and keep them there. His sole objective, he stated, was to produce all the coal possible.

Carrying his plans still further, Mr. Ickes announced June 28 the appointment of Carl Elbridge Newton, president of the



New York Times photo
Carl E. Newton

Chesapeake & Ohio Railway Co., as director of mine operations for the government until peace has been restored in the coal industry. Forty-five years old and a resident of Cleveland, Mr. Newton is a graduate of Dartmouth College, where he

achieved honors in economics and political science and was elected to Phi Beta Kappa. He also won a Rhodes scholarship, later being admitted as a barrister of the inner temple in London.

Following graduate studies at Harvard, with special attention to administrative law, he entered private practice with a New York law firm in 1924 as a railroad counsel. He shifted from legal work into executive management during railroad reorganizations in the 1930's and was elected a director of the C. & O. last year, later becoming president of the company.

It was explained that Mr. Newton will exercise all the authority vested in Mr. Ickes himself as federal operator of the mines under President Roosevelt's May 1 seizure of the coal properties. He will, however, be subject to the supervision of Mr. Ickes.

Secretary Ickes told the House Ways and Means Committee June 28 that the government had "no desire and no plans for nationalization" of the coal industry and hopes to return the mines to private ownership "at the earliest possible moment." That moment, he added, would be when there is "reasonable assurance" that the miners would work for private owners or when the workers and the operators signed a contract.

End of Third Mine Stoppage Ordered on June 22 On Condition Government Operation Continues

Miners Ordered Back a Third Time With the Proviso That Government Operation Continue—Action Ends Stoppage Following War Labor Board Decision Ordering Two-Year No-Strike Contract and Rejecting Portal-to-Portal Pay—Attempts to Make Separate District Contracts Fail

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"The executive officers of the international union are hereby expressly authorized to exercise their discretion in the filing of suits at law, or by any other necessary means, to protect the equity of the membership in the matter of portal-to-portal compensation, both as to current and deferred liability.

"As affecting the anthracite membership of Districts 1, 7 and 9, it is recognized that this arrangement is subject to any agreement that may ensue as a result of current wage negotiations."

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C.A. July, 1942

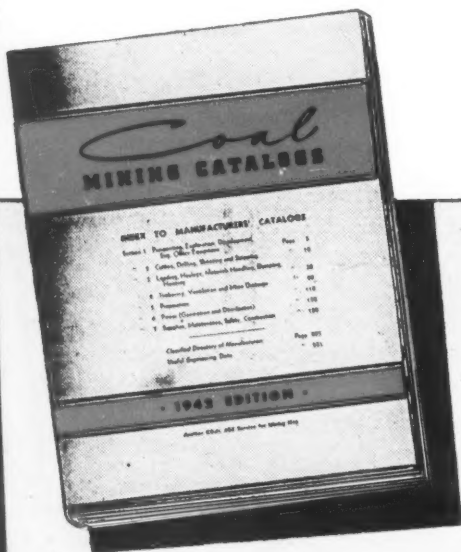
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Interior Department, at 10:30 Friday morning, June 25, of the principal owners and operators of such mining properties in order to take stock of the situation and to hear such suggestions as may be offered. You are invited to attend that conference in person. Proxies, substitutes or representatives are not expected."

Representing the Interior Department and the Solid Fuels Administration at the meeting were Secretary Ickes, Undersecretary Fortas, Assistant Secretary Strauss, Deputy Solid Fuels Administrator Gray and Associate Deputy Thomas.

Operators in attendance were: O. L. Alexander, Pocahontas Fuel Co.; Charles G. Berwind, Berwind-White Coal Mining Co.; D. W. Buchanan, Old Ben Coal Corp.; L. C. Campbell, Koppers Coal Division; J. W. Carter, Carter Coal Co.; Heath S. Clark, Rochester & Pittsburgh Coal Co.; H. T. DeBardeleben, DeBardeleben Coal Corp.; C. C. Dickinson, Dickinson Fuel Co.; E. M. Douthat, Sinclair Coal Co.; B. F. Fairless, Carnegie-Illinois Steel Co.; H. L. Findlay, Youghiogheny & Ohio Coal Co.; J. D. Francis, Island Creek Coal Co.; L. Ebersole Gaines, New River Co.; Charles F. Huber, Glen Alden Coal Co.; R. L. Ireland Jr., Hanna Coal Co.; M. L. Jacobs, Industrial Collieries Corp.; R. E. Jamison, Jamison Coal & Coke Co.; Forney Johnston, Alabama; R. H. Knodel, General Coal Co.; H. B. Lee, Maumee Collieries Co.; J. D. Mahan, Bethlehem Steel Co.; E. C. Mahan, Southern Coal & Coke Co.; Eugene McAuliffe, Union Pacific Coal Co.; Fred S. McConnell, Enos Coal Mining Co.; J. B. Morrow, Pittsburgh Coal Co.; Harry M. Moses, H. C. Frick Coke Co.; Charles O'Neill, United Eastern Coal Sales Corp.; T. F. Patton; George W. Reed, Peabody Coal Co.; Walter R. Robison; R. H. Sherwood, Central Indiana Coal Co.; K. A. Spencer, Pittsburg & Midway Coal Mining Co.; R. E. Taggart, Philadelphia & Reading Coal & Iron Co.; J. P. Williams Jr., Koppers Co.; Ezra Van Horn, Ohio; and E. B. Winning, Republic Steel Co.

Talks Highly Successful

A long statement was presented by Mr. Ickes at the meeting, after which the operators caucused and appointed an eight-man committee to continue the discussions. Members of this committee are Messrs. Clark, Francis, Morrow, McAuliffe, Robison, Moses, Williams and Dickinson. A spokesman for Mr. Ickes reported June 26 that the talks were "highly successful" and that the eight committeemen accepted the government operation arrangement as essential at the moment and would cooperate in every way for maximum production. In the course of the proceedings, Mr. Ickes was reported to have made it clear that he did not want to keep the mines any longer than was necessary and that it was to everybody's interest to get the mines on a maximum-production basis and keep them there. His sole objective, he stated, was to produce all the coal possible.

Carrying his plans still further, Mr. Ickes announced June 28 the appointment of Carl Elbridge Newton, president of the



Carl E. Newton
New York Times photo

Chesapeake & Ohio Railway Co., as director of mine operations for the government until peace has been restored in the coal industry. Forty-five years old and a resident of Cleveland, Mr. Newton is a graduate of Dartmouth College, where he

achieved honors in economics and political science and was elected to Phi Beta Kappa. He also won a Rhodes scholarship, later being admitted as a barrister of the inner temple in London.

Following graduate studies at Harvard, with special attention to administrative law, he entered private practice with a New York law firm in 1924 as a railroad counsel. He shifted from legal work into executive management during railroad reorganizations in the 1930's and was elected a director of the C. & O. last year, later becoming president of the company.

It was explained that Mr. Newton will exercise all the authority vested in Mr. Ickes himself as federal operator of the mines under President Roosevelt's May 1 seizure of the coal properties. He will, however, be subject to the supervision of Mr. Ickes.

Secretary Ickes told the House Ways and Means Committee June 28 that the government had "no desire and no plans for nationalization" of the coal industry and hopes to return the mines to private ownership "at the earliest possible moment." That moment, he added, would be when there is "reasonable assurance" that the miners would work for private owners or when the workers and the operators signed a contract.

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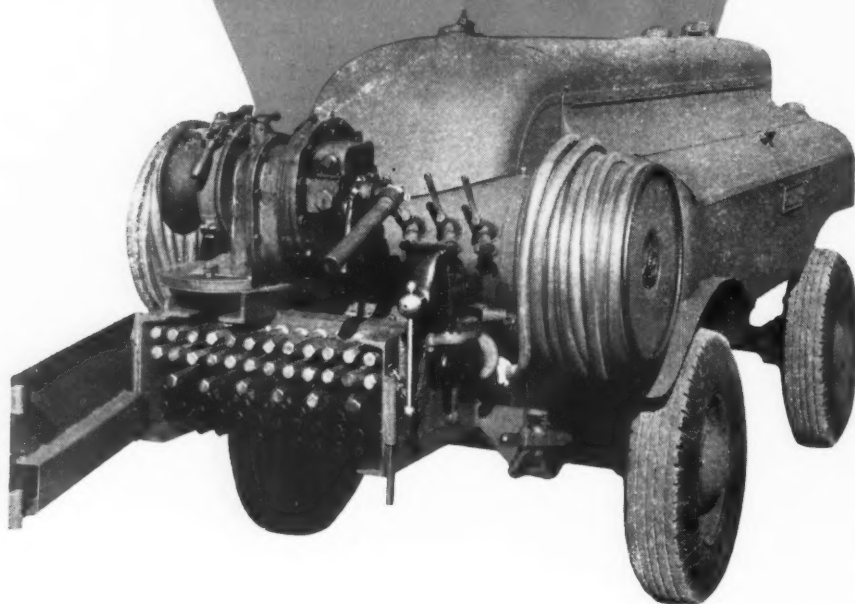
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Lewis ordered the stoppage ended until June 20. Ordering the mines reopened on June 7, Administrator Ickes directed that contracts be adjusted to take into account the increase in vacation pay (\$20 to \$50) ordered by WLB, as well as cancellation of lamp and other charges. The same day (June 4) WLB reaffirmed its stand that negotiations could not continue until the men had returned to work. The operators demurred with the union but obeyed.

Resumption of discussions June 7, the date of the miners' return, brought no relief from the deadlock over the portal-to-portal question. The day also was marked by announcement by Governor Green that the Illinois Coal Operators' Association had reached agreement with the United Mine Workers on a new contract, although it had not yet been signed. The agreement was the result of an interchange of telegrams, the operators' reading as follows:

Illinois Negotiations Near

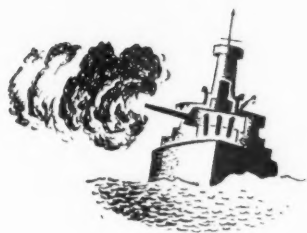
"The Illinois Coal Operators' Association is ready to enter into negotiation with the United Mine Workers to extend the contract effective April 1, 1941, in line with the directive of the WLB and to provide as follows: the portal-to-portal payments shall be \$1.50 a man for each day's work and shall be retroactive to April 1, 1943, subject to approval by the WLB. The payment of the retroactive pay shall be determined by negotiation."

Reports also were current that Indiana was considering a similar step. And on June 9, after the northern and southern Appalachian operators had reported disagreement and requested a hearing in accordance with the time limits of the WLB order of May 25 (June Coal Age, p. 103), the Central Pennsylvania Coal Producers' Association announced that it had withdrawn from the Appalachian conference and would sign a separate agreement. The general conference came to a stalemate when Lewis refused to alter his demand for portal-to-portal pay of \$1.50 for a 30-day period while a commission determined the actual time consumed. The operators held out for 48 minutes as the basis of payment, against Lewis' 90.

The central Pennsylvania understanding called for a portal-to-portal payment of \$1.30 per day, and even though a final contract had not been worked out, Lewis immediately stated that it would be "the Appalachian agreement, when accepted by the rest of the operators." He also stated that "the agreement, of course, will be contingent upon approval by all properly constituted governmental agencies and contingent, of course, upon approval of prices to permit the agreement to be effective."

With WLB reassuming jurisdiction, public hearings began June 10, with the miners still refraining from putting in an appearance. R. L. Ireland, Jr., Hanna Coal Co., elected spokesman for the northern group, vice Charles O'Neill, central Pennsylvania, yielded to Senator Edward R. Burke, spokesman for the southern operators. Senator Burke asked for a clarification of the board's previous ruling on reclassification of trappers, flaggers, switchthrowers, etc.; declared that any ad-

Towline FOR NAVAL TARGETS



A taut steel rope angles down into the boiling wake, so small in proportion to the vessel that it seems like a fishing line over the stern of a rowboat.

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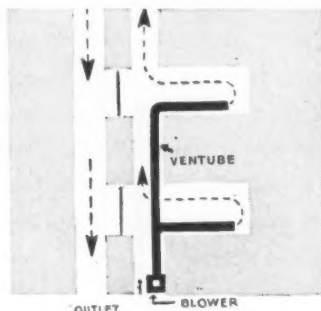
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2. Inspect "Ventube" regularly for possible leaks, and check air discharge. If repairs are needed, don't delay.

3. Inspect and lubricate blowers. Keep them on firm, level foundation, in a protected place, free from obstructions.

4. Place all blowers directly in fresh air intake, 15 feet or more upstream from the last crosscut, to avoid recirculating bad air returning from faces to main current. (See diagram.)

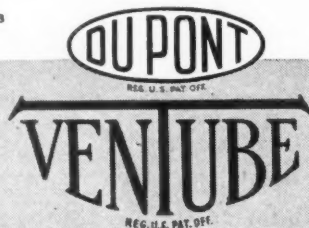


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COMING MEETINGS

- American Mining Congress: 20th annual convention, July 19 and 20, Netherland Plaza Hotel, Cincinnati, Ohio (postponed from May 17 and 18).
- National Safety Council: 32d congress and exposition, Oct. 5-7, Hotel Sherman, Chicago.
- American Institute of Mining and Metallurgical Engineers and American Society of Mechanical Engineers: joint fuels conference, Oct. 28 and 29, William Penn Hotel, Pittsburgh, Pa.

ditional pay for portal-to-portal would be only a slightly disguised wage increase not required by the law as construed and applied by the Administrator of the Fair Labor Standards Act, asked clarification on the ruling on vacation pay, suggesting an incentive plan instead; requested reconsideration of the ruling on leasing of mines; urged clarification of the tools question and the six-day week; declared that any wage increase must be followed by a price increase, etc.

Mr. Burke was followed by Mr. O'Neill, who explained the terms of the proposed central Pennsylvania agreement. After discussion of some other points, the board declared that a decision would be handed down at the earliest possible date and asked suggestions as to modifications of the contract, which the operators supplied June 11.

Meantime, Secretary Ickes, who had on June 8 directed mine operating managers to refund lamp and other charges back to April 1, stirred up the miners June 10 by slapping fines on them for the days they were out after May 31. With Lewis and other mine officials hitting the ceiling and strikes popping up in Alabama, Pennsylvania and elsewhere, Ickes modified his stand June 11, stating that he had issued instructions to the effect "that if there is any dispute as to the assessment, collection or remission of fines, it shall be handled between the persons immediately in charge of the operation of the mines and the appropriate committee of the union." Consequently, no action was taken to collect the fines and the walkouts came to an end.

While WLB was making up its mind, the Illinois and central Pennsylvania agreements were striking tough sledding. Illinois negotiators found themselves in disagreement upon how to apply the portal-to-portal rate upon which they had agreed. On June 15, Mr. O'Neill reported to WLB that central Pennsylvania had been unable to reach final agreement with the union. The stumbling block was the union's refusal to protect the operators against suits for back pay to the date when the Fair Labor Standards Act went into effect.

June 18 brought the bad news to the miners, with WLB flatly rejecting their

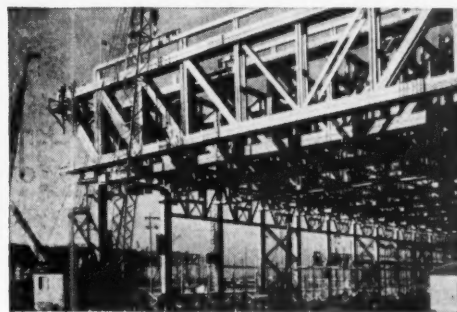
REPORTING FOR DUTY



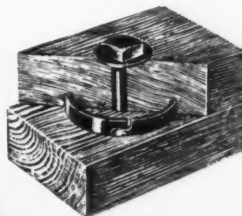
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demands for portal-to-portal pay, the four labor members dissenting. Citing the successive figures of \$2, \$1.50 and \$1.30 a day, the board declared that "it is obvious that these figures are out of all proportion to any amount that could possibly be due to the miners under the Fair Labor Standards Act, even if the courts should decide all questions in controversy in favor of the mine workers. The demand is plainly and unmistakably a demand for an 'indirect wage increase in violation of the wage-stabilization policies,' contrary to the board's directive order of May 25, 1943."

Board Issues Order

Declaring further that "the total liability of any operator under the Fair Labor Standards Act would be the sum of his liability to those workers whose travel time amounted to one hour a day or more," the board observed that "the opportunity we gave to the mine workers and the operators to work out a reasonable settlement of the claim under the Fair Labor Standards Act was not taken advantage of, and they did not reach a settlement. We cannot force upon them a settlement of a lawsuit which we have no power to decide." In view of this, the board made the following order:

"The demand of the mine workers that 'the maximum hours and working time provisions be amended to establish portal-to-portal for starting and quitting time for all underground workers' is hereby denied.

"The mine workers remain free to press their demand before the administrator of the Fair Labor Standards Act and in the federal court and the operators retain their rights to seek pertinent administrative and court rulings.

"The parties remain free to agree to a settlement of their prospective lawsuit. If they should agree to a settlement, the board, as the agency of the government charged with the administration of the wage stabilization program, will rule whether the agreement is a genuine settlement of the lawsuit compatible with the stabilization program."

Other points in the June 18 order included:

Continuation of present agreements, "except as hereinafter provided and unless changed by mutual agreement of the parties thereto," until and including March 31, 1945.

Amendment of the basic tonnage rates in each agreement "by striking out the final paragraph thereof, 'Yardage and deadwork rates in all districts shall be increased 15 percent'; provided, however, that such increases are already in effect."

Amendment of agreements to raise vacation pay from \$20 to \$50.

Amendment of miscellaneous provisions in each agreement to read: "The operators shall furnish necessary tools to day and monthly men without charge. They shall also furnish necessary tools or money equivalent to mine workers employed at tonnage, yardage or footage rates." "Safety equipment and devices, including electric cap lamps, shall be furnished by the operators without charge. This shall not

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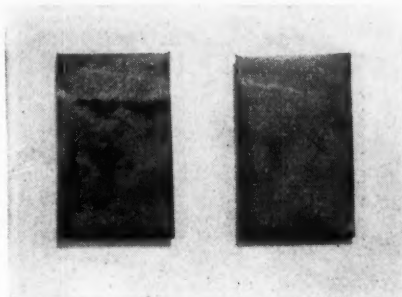
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Surfaces coated with Anti-Corrode can be handled freely without danger of rust spots caused by hand acid.

ANTI-CORRODE MEETS U. S. NAVY TEST



BOTH STRIPS of freshly ground steel pictured here were immersed for 20 hours in a 3% salt solution. Strip on left was untreated; strip on right, coated with Anti-Corrode, shows no trace of rust. (Even after 90 hours of immersion Anti-Corrode coating still resisted rust.)

A LUBRICANT, TOO

Anti-Corrode is compatible with drawing compounds; there is no need to remove it from

metal about to be drawn, stamped or otherwise formed.

IDEAL FOR MANY USES

Anti-Corrode can be used on almost every kind of metal or metal equipment—indoors or outdoors. Fencing, piping, tubing, wire, wire mesh, girders, sheet metal, metal stock, machinery, trucks, spare automotive parts, tools, metal containers—all need the protection of this new corrosion preventive.

ECONOMICAL

In accordance with regular U. S. Navy Test procedure, Anti-Corrode proved far superior to other leading anti-rust compounds costing as much as 25% to 40% more per gallon.

Whatever metal equipment you may have, you owe it to yourself to investigate the money-saving advantages of Cities Service Anti-Corrode. (One gallon of Anti-Corrode protects approximately 1200 square feet of sheet metal.) Send the coupon below for further information on how to obtain an adequate sample of Anti-Corrode FREE.

CITIES SERVICE OIL COMPANY
Room 1392,
Sixty Wall Tower, New York.

Gentlemen: I'd like to test Anti-Corrode on my own equipment FREE OF CHARGE. Send me the details.

Name.....

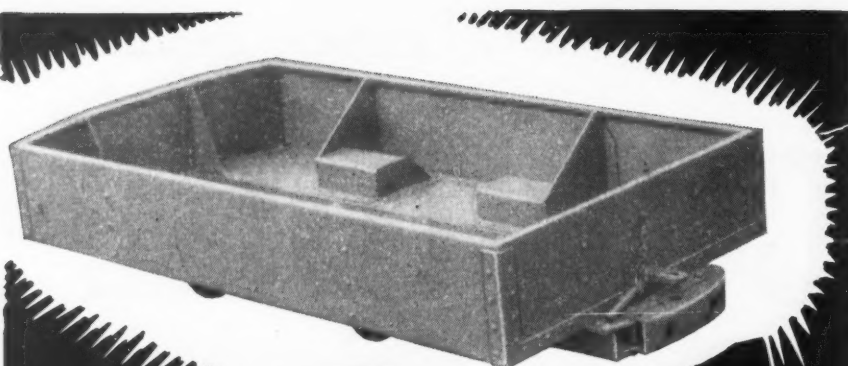
Title.....

Company.....

Address.....

OIL IS AMMUNITION—USE IT WISELY!





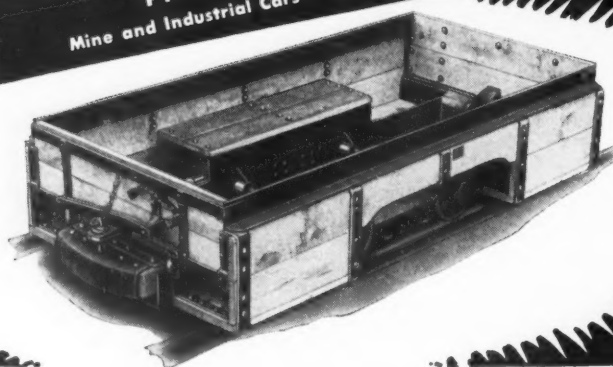
MINE CARS STEEL OR WOOD BUILT TO TAKE IT!

Steel or wood—there's an extra margin of rugged stamina in Phillips Mine Cars. Built for overloads, excessive speed, and abuse of heavy war production. Write for a Phillips proposal.

PHILLIPS
MINE AND MILL SUPPLY COMPANY

PITTSBURGH, PENNSYLVANIA

Mine and Industrial Cars—Fabricated Steel—Iron Castings



Mosebach Rail Bonds To Insure Longer Life

Mosebach Rail Bonds are manufactured under the patented Flashweld process. This method of welding provides an absolute connection between the forged steel terminal and each individual strand of copper cable. The illustration has a portion of the terminal cut away to show the perfect weld obtainable. Write for complete information.



MOSEBACH
ELECTRIC & SUPPLY COMPANY
1115 Arlington Avenue, Pittsburgh, Pa.

include, however, personal wearing apparel such as hats, clothing, shoes and goggles." "No charge shall be made for blacksmithing." "Matters affecting the cost of explosives and house coal are referred to the district conferences." "To the extent that it has been the custom in each district, all bottom coal shall be taken up and loaded by the mine worker." "The cutter shall cut the coal as directed by the operator."

Amendment of the protective wage clause by adding: "For the duration of the war no strike shall be either called or maintained hereunder."

Insertion in each agreement of the following clause: "The operators agree that they will not let any operating mines subject to this agreement as a subterfuge for the purpose of evading the provisions of this agreement."

Agreement to Run Two Years

Insertion in each agreement of the following provision regarding duration: "This agreement shall be effective as of April 1, 1943, and shall continue in effect to and including March 31, 1945, except as to general wage rates, which may, on thirty (30) days' notice from either party be reopened for negotiation at the end of the first contract year. The foregoing sentence shall not preclude the parties from mutually agreeing at any time during the term of this contract on changes in general wage rates subject to such approval by the appropriate governmental agencies as may be required by the Act of Congress of Oct. 2, 1942, and the executive orders and regulations issued thereunder. Furthermore, if at any time during the term of this agreement a significant change occurs in governmental wage policy, either party shall have the right to request negotiations on general wage rates."

Amendment of Schedule A in each agreement to provide that rates paid on track-mounted cutting machines and footage, tonnage or yardage rates on conveyors and other mechanical-loading equipment shall be those provided in the various district agreements effective April 1, 1941.

Amendment of Schedule B to provide that able-bodied labor employed as greasers, trappers, flaggers and switchthrowers shall be paid not less than 85.7c. per hour and \$6 per day, with the proviso that in district agreements the rate may be made the same as inside unclassified labor (96.6c. per hour or \$6.76 per day), without further board approval; that outside able-bodied labor, such as slate pickers, be paid not less than 85.7c. or \$6; and that strip workers shall be paid as provided in the various district agreements effective April 1, 1941.

Amendment of six-day supplemental agreements to include the following: "All employees at mines working six days per week shall be given a fair and equal opportunity to work on each of such six days. Laying off individual workmen during the week for the purpose of denying them six days' work is prohibited during the term of this supplemental agreement. This shall not, however, be construed as

a guarantee to give each employee work for six days per week where work is prevented by reasons of breakdowns, accidents, operating requirements, unsafe conditions or for reasons beyond the control of the management. Upon the cessation of hostilities in the war, the work week shall automatically revert to five days."

Spotting of cars to be settled in district conferences in accordance with the board's May 25 directive.

News of the decision resulted in walk-outs at several mines the day it was issued, these swiftly growing to more than 50,000 by the time the truce expired, midnight June 20. The operators immediately asked that negotiations be resumed, and discussions were held until noon June 20, when the conference broke up. That day, Lewis issued a bitter blast against the operators and WLB, concluding with the following:

"In refusing to work for the coal operators on the detestable terms which they offer through the War Labor Board, we assert the willingness of the mine workers to work for and continue the production of coal for the government itself, under the direction of the custodian of mines since governmental seizure of the properties. The mine workers have no favors to grant the coal operators nor the members of the War Labor Board, who have dishonored their trust, but will make any necessary sacrifice for the government, the upholding of our flag and for the triumph of our war effort. Accordingly, the executive officers of the United Mine Workers of America are hereby instructed to hold themselves in readiness to confer with the Secretary of the Interior, who, by Presidential executive order of May 1, 1943, is instructed and empowered 'to do all things necessary for or incidental to the production, sale and distribution of coal'."

WLB Appeals to Roosevelt

Conferences between Lewis and Ickes got under way June 21, while WLB declared that the only issue was whether Lewis and the miners would "abide by the same rules and the same laws which are applicable to all other groups" and asked the President June 22 "to use all the powers of government necessary" to force the union to sign the two-year contract with no-strike clause. Meantime, it was announced that Secretary Ickes and other Interior Department officials had under consideration the setting up of a permanent organization to operate the mines for the duration.

Lewis again relented and called off the third stoppage June 22 (see opening paragraphs in this report).

The union order, which failed to get the miners back in anything like full numbers until June 29, was preceded by a WLB request to President Roosevelt that he use all necessary government powers to force the union officials to sign the prescribed contract. On June 23, the northern and southern Appalachian negotiating groups addressed the President on the facts of the dispute, concluding with the following:

"Throughout this dispute we have com-

New Electrical Handbook For Mine Electricians

FREE!



Practical Applications of Electrical Equipment

You should have a copy of this new book entitled *Electrical Equipment for Mining Applications*. This book contains a summary of how to prevent many of the hazards of electricity in your mine. Information is given pertaining to applications of various types of switches, fuses and motor mechanisms. You can see how to convert oil circuit breakers to operate fully automatic . . . how an uninterrupted flow of power can be maintained even if the preferred circuit is put out of commission . . . how you can selectively sectionalize any circuit. Complete fuse coordination data is given. All in all, *Electrical Equipment for Mining Applications* is a valuable, helpful booklet that you should have. It's yours, free for the asking! Send the coupon now.

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Equipment  Corporation

28 S. 20th St. Birmingham 3, Ala.

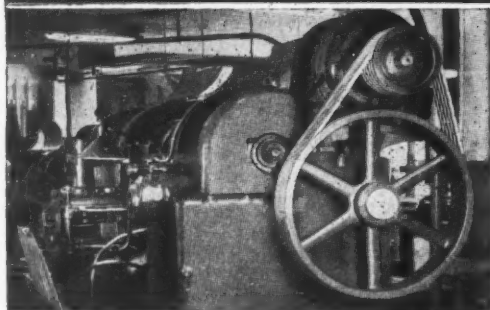
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Mail Coupon Now

Southern States Equip. Corp., Birmingham, Ala.
Gentlemen: Send me the handbook offered here

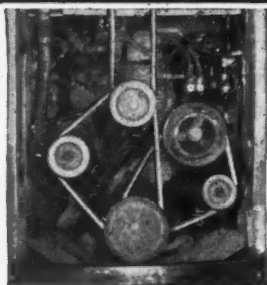
Name Title Co. City State C.A. 7-43

In Use for Years by Leaders of U. S. Industry



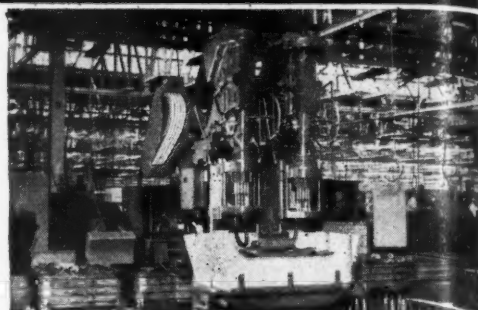
In a Leading Machine-Parts Plant—

belts on screw machines and grinders are subjected to a severe oil condition. GATES special synthetic belts were adopted 100% for this severe service after months of testing proved that they last three times as long as any rubber belt ever used.



A Large User of Rear Engine Coaches

could get only 13,000 to 14,000 miles from natural rubber belts in rear engine coach and bus service where rapid and frequent acceleration and deceleration create high temperatures. GATES special synthetic belts are giving double the life in this demanding service.



This Outstanding Aircraft Factory

—one of the nation's leaders—has found that Gates special synthetic belts last three to four times as long as regular rubber belts on machines where the belts are badly exposed to oil.

GATES

Heat and Oil V-BELTS

of *Special* Synthetic Rubber

Are Giving Up to 230% Longer Life than natural rubber belts when subjected to heat and oil . . . Initial cost at present is higher . . . recommended to meet especially severe oil and heat conditions.

Gates has been building V-belts with synthetic rubber for many years. Thousands upon thousands of Gates V-belts without an ounce of natural rubber in them have now seen years of service in many of the nation's leading industrial plants.

From this long experience with synthetic rubbers, Gates engineers have developed a V-belt built of a special synthetic which withstands severe heat and oil conditions that natural rubber simply cannot stand. The initial cost of these special belts is at present higher than Gates Standard Vulco Ropes. That is why the

Gates Field Engineer you consult now recommends this special heat and oil belt only if its higher cost will be more than offset by longer service life.

There are many commercial types of synthetic rubbers. Gates has had wide experience in the use of all of them.

You have doubtless seen recent press dispatches stating that all V-belts will shortly be made of synthetic rubber. Gates long experience and success in this field clearly represent a substantial advantage in giving you a synthetic rubber V-belt of truly superior quality.

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Engineering Offices and Stocks in All Large Industrial Centers

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DALLAS, TEXAS
2213 Griffin Street

ATLANTA, GA.
738 C. & S. National Bank Building

PORTLAND, ORE.
333 N. W. 5th Avenue

LOS ANGELES, CAL.
2240 East Washington Boulevard

SAN FRANCISCO, CAL.
1090 Bryant Street

DENVER, COLO.
999 South Broadway

plied with the government's directives and are now doing so to the best of our ability. However, we respectfully submit to you that no proper settlement of the issue has been made if we are still to be deprived of the use of our property because of the defiance of orderly government by the other party to the controversy. If we are compelled to comply with the settlement made by the WLB, then certainly the same rule must apply to the United Mine Workers of America.

"If the mines are to be operated on the above-quoted terms it can only mean that the coal operators are to be punished because Mr. Lewis did not see fit to obey the orders of the United States Government. This we do not believe you will permit. Therefore, we respectfully urge that you require the prompt completion of the agreement ordered by the WLB so that normal operation may be resumed and the mines returned to their rightful owners."

Prescribes WLB Terms

Condemning the actions of the U.M.W. officials, the President later in the day said that "the mines for the time being of course will continue to be operated by the Secretary of the Interior under the Executive Order of May 1. The terms and conditions of employment will be those announced by the National War Labor Board in its directive of June 18. There has been no promise or commitment by the government to change these terms and conditions in any way.

"Before the leaders of the United Mine Workers decided to direct the miners to return to work, the government had taken steps to set up the machinery for inducting into the armed services all miners subject to the Selective Service Act who absented themselves without just cause from work in the mines under government supervision.

"As the Selective Service Act does not authorize the induction of men above 45 years into the armed services, I intend to request Congress to raise the age limit for non-combat military service to 65 years. I shall make that request of Congress so that if at any time in the future there should be a threat of interruption of work in plants, mines or establishments owned by the government, or taken possession of by the government, the machinery will be available for prompt action." The President, in fact, did make such a request later in his veto of the Connally-Smith bill, later passed over his veto (see news report elsewhere in this section).

This pronouncement, however, failed to move Lewis, and WLB, still unsatisfied, appealed to War Mobilization Director Byrnes, stating that since employers had been forced to conform to its directives there was no reason why Lewis should be permitted to escape. Continued silence on Lewis' part, plus pleas for action from other sources, brought a statement from the President June 25 that he would not recognize or accept the Oct. 31 deadline set by Lewis.

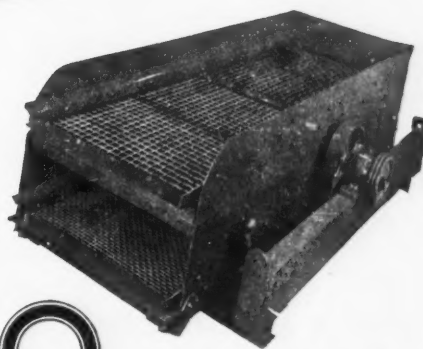
Meantime, Secretary Ickes called a meeting of operators to discuss extension of government control (see report elsewhere

Results



with

SECO



This letter tells a graphic story of RESULTS with SECO SCREENS.

You may find it profitable to investigate what SECO screening equipment will do in your preparation plant.

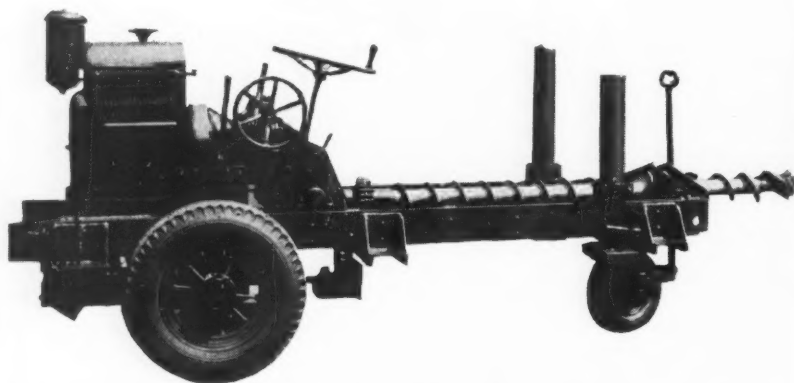
Descriptive catalog sent on request

SCREEN EQUIPMENT CO., INC.
9 Lafayette Ave., Buffalo, N. Y.

PARMANCO Horizontal Drills

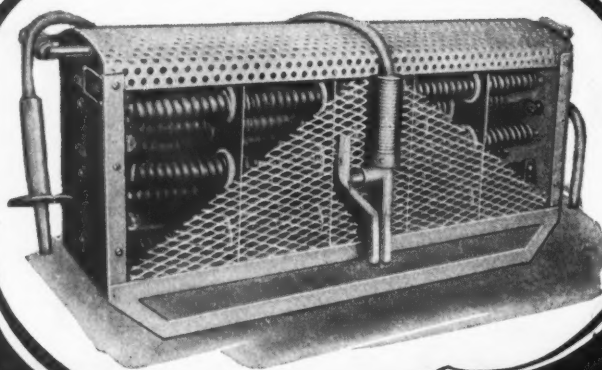
"Positive Control Drilling"

Parmanco Horizontal Drills give you "Positive Control Drilling." Parmanco Vertical and Horizontal Drills are today's leaders in low cost, low maintenance drilling—All Parmanco Drills are equipped with patented Parmanco augers. Used by leading strip mine operators—Write us your drilling problems.



PARIS MANUFACTURING CO.
PARIS, ILLINOIS

**WILL STAND ABUSE AND REPEATED USE
...IDEAL FOR MINE SERVICE!**



• One look at this hardy, easy-to-handle welder and you'll know it was made by people who know mine welding requirements. Large wire size resistance coils won't oxidize and scale off from repeated heating and cooling—will withstand vibration and rough handling. Only 9¼" thick; built to be dragged; obtains full rated current on as low as 195 volts. Write for details and prices.

**THE G.M.C.
PORTABLE
WELDER**

**GUYAN MACHINERY
COMPANY**

LOGAN WEST VIRGINIA

in this section), while miners still lagged in returning to work. Following passage of the Connally-Smith bill over the President's veto and his request for draft power to force work, a number of men, in fact, went out again. By June 29, however, the majority were back at work and complete end of the stoppage was expected by the end of the month.

In anthracite, substantial progress on a new contract was reported, one version having it that the contract had been largely written except for the wage provisions.

Personal Notes

JOHN CAIN, chief electrician, Black Diamond Coal Mining Co., has been transferred from the Blocton mine to the Blue Creek operation, both in Alabama.

T. J. CHILDERS, Jenkins, Ky., has been named as mine foreman for the West Virginia Coal & Coke Corp., Omar, W. Va. For several years he has held a similar position with the Consolidation Coal Co. in the eastern Kentucky field.

LARRY DERENGE, former superintendent, Island Creek mine No. 7, Holden, W. Va., has been appointed assistant general superintendent of the company's mines. HUBERT BARBER has been made superintendent at No. 7.

C. R. HUMPHREY, Whitesville, W. Va., employed for ten years by the Island Creek Coal Co. at Holden, has been appointed a district mine inspector, succeeding LAWRENCE LOUD, resigned.

JOHN LAWLEY has been promoted from mine electrician to chief electrician at the Blocton mine, Black Diamond Coal Mining Co., Blocton, Ala.

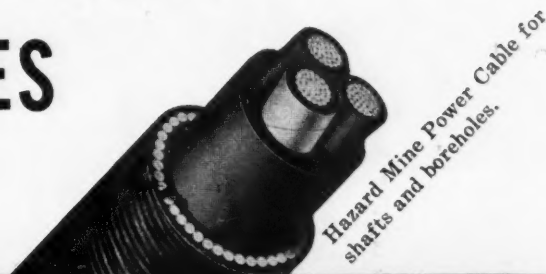
EDMUND MCCARTHY, fuel engineer, of New York City, has been added to the technical staff of the Coal Bureau of the Upper Monongahela Valley Association, with offices in Fairmont, W. Va., and New York City. He goes to the bureau from the Philadelphia & Reading Coal & Iron Co., where he served as fuel engineer. Prior to this he was boiler-room test engineer for the New York Edison Co. and previously was in the operating department of the Delaware & Hudson Co. The major part of Mr. McCarthy's work will be in cooperation with industrial consumers, consulting engineers and equipment manufacturers in connection with oil conversions, equipment design and coal and application.

J. FLOYD MERCER, formerly with the Elkhorn Jr. Coal Co., Millstone, Ky., has been advanced to general manager of the Premium Coal Co., Premium, Ky.

FRED A. MILLER, recently vice president in charge of operations, Franklin County Coal Corp., Herrin, Ill., has been appointed chief engineer for the Consolidated Coal Co. with headquarters in St. Louis, Mo.

ALBERT C. MURRAY, formerly superintendent of the Hull mine, DeBardeleben Coal Corp., has been named superin-

TO EXPEDITE SHIPMENT OF WIRES *and* CABLES



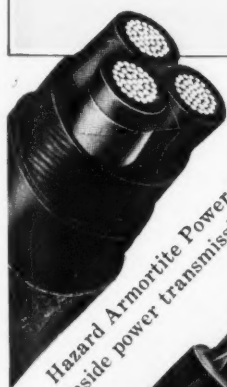
*Hazard Mine Power Cable for
shafts and boreholes.*

Do:

- ... order your wire requirements as far in advance as possible so that manufacture of your material can be planned in our production schedule.
- ... consult with government engineers to check with their requirements before purchasing cable for a *government financed project*.
- ... try, wherever possible, to use designs of cable that are available in stock or the simplest to make.
- ... avoid complicated splices and fittings. Your Hazard representative can tell you how to simplify installations.
- ... supply us with cutting lengths promptly as we cannot start manufacture, in most cases, until we have this information.

don't:

- ... specify cables that are unnecessarily complicated. Each operation on a cable requires special machines, any one of which may be cause of delay. Keep your cable design simple. Consult your Hazard representative as to how you can do this.
- ... order short lengths of many sizes. Standardization on a few sizes almost always results in lower cost per foot and much quicker delivery.
- ... send your order in without specifying conditions of installation, supplying properly certified allotment number or symbol and Army, Navy or other government contract number—if any. This information is necessary before your order can be included in our production schedule.



*Hazard Armortite Power Cable for
inside power transmission.*



*Hazard Twin Parallel portable
mining machine cable.*

HAZARD is able to supply many types of electrical wires and cables subject, of course, to War Production Board limitations. If you need insulated electrical conductors, get in touch with your nearest Hazard representative; he can help you in many ways ... HAZARD INSULATED WIRE WORKS, Division of The Okonite Co., Wilkes-Barre, Pa.



HAZARD



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3359

They're Dependable!
They're Uniform!
**They'll Help Increase
 Tonnage**



TODAY more coal must be mined quicker by fewer men, so that the length of time required to prepare a hole and fire it becomes an important factor in increasing tonnage.

To meet these problems Du Pont Electric Blasting Caps have distinct advantages. First: the leg wires are carefully folded into a figure 8, and bound together by a loosely fitting, easily removed paper band. This band, while holding the wires compactly together, does not permit them to become kinked, bent, tangled or snarled. Second: every cap is equipped with a metal shunt, which may be removed in a fraction of a second by simply pulling the wires apart. The metal shunt gives added protection against accidental firing of the cap itself.

Every Du Pont Electric Blasting Cap is carefully

inspected both during and after the manufacturing process, to be sure it meets the rigid requirements of today's operating conditions.

Ask your Du Pont representative for complete information. E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington, Del.

HINTS FOR BETTER BLASTING

To prevent accidental firing make removal of the metal shunt the last step before connecting the leg wires into the blasting circuit.

To prevent gaps between cartridges, place the entire charge into the collar of the hole and push it back as a single unit.

SAVE FATS FOR EXPLOSIVES. Fats are urgently needed for making glycerin—an essential ingredient in the production of high explosives. You can help by urging housewives to take waste fats to their butchers.

DU PONT
 REG. U. S. PAT. OFF.
Electric
BLASTING CAPS

tendent of the Southern Cotton Oil Co.'s Alta Coal Division, which operates the Summit mine, Sumiton, Ala.

D. A. THOMAS has been appointed vice president and general manager of the Southern Coal & Coke Co., Boothton, Ala.

C. O. WATSON, who was assistant manager, Kentucky division, Consolidation Coal Co., under the late J. D. Snyder, who died June 15, has been made acting division manager.

B. ARNOLD WORKMAN has been appointed assistant general superintendent of the Lorado Coal Mining Co., Lorado, W. Va.

Vawter Made General Manager For Bituminous Coal, Inc.

Harry M. Vawter, New York district manager for the Saturday Evening Post since 1931 and a member of the staff from 1925, has been appointed general manager of the new national educational and public relations agency for the entire soft-coal industry, Bituminous Coal, Inc. In making the announcement John D. Battle, secretary of the National Coal Association in Washington, D. C., of which the new



Harry M. Vawter

organization will be an affiliate, said the offices of Bituminous Coal, Inc., will be established in New York City.

Prior to his association with the Curtis Publishing Co. in 1925 Mr. Vawter had a wide sales, merchandising, advertising and managerial experience with the Chicago Pressed Steel Co., the W. D. Allen Mfg. Co. of Chicago and with his family's firm, the Baker-Vawter Co., which was a pioneer manufacturer of office equipment and devices.

New Institute Member

The Anthracite Institute announces election to membership of the Stevens Coal Co. (Trevorton colliery), Wilkes-Barre, Pa., of which George H. Jones is president.

*Get those
4-F MOTORS
into the
1-A Class!*



If motor failures are slowing up production and causing trouble—and such trouble can be traced to sleeve bearings—here's the answer . . .

INSTALL NEW KEYSTONE BALL BEARING END BELLS

We'll ship direct to your plant new motor end bells complete with Fafnir Ball Bearings to fit standard general purpose A C and D C motors. Your own mechanics can easily install them! Your old motor shaft is used—no adapters of any kind needed.

Write for Descriptive Folder

Get the details of this proposition—let us show you how you can save money—get better motor service, longer motor life. Write us today.

REASONS WHY

Keystone Ball Bearing End Bells prevent motor failures:

- (1) Ball bearings will usually far outlive sleeve bearings. Bearings will rarely wear enough to allow the rotor to rub the stator.
- (2) Grease replaces oil as a lubricant and is retained by felt seals. (Oil, used on ordinary sleeve bearings will penetrate motor windings and cause dirt to accumulate.)
- (3) Grease is not fluid—whereas oil vapor can be carried by the ventilating air and deposited on windings.
- (4) Grease lubrication required only from 1 to 4 times a year depending on the severity of the service.

KEYSTONE Electric Company

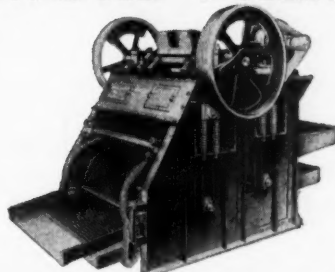
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MORE PREMIUM SIZES

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AT LEAST 30%
LESS FINES

Patented Vertical Pick Breaker reduces medium size lump to egg or nut. Type B illustrated with shaking feed. Type A equipped with conveyor feed.

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MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL
Main Office and Works General Sales Office Eastern Office
Pittsburg, Kansas 307 N. Michigan Ave., Chicago Koppers Bldg., Pittsburgh, Pa.

SEND
FOR
LATEST
BULLETIN

Cornerstones of Profitable Mining Scrutinized On Illinois Institute Boat Trip

**Close Attention to Maintenance Called For With Replacements Scarce
—Careful Control of Supplies Important in Storekeeping—Combined
Truck and Rail Haulage Justifies Itself at Strip Property**

THREE important cornerstones of profitable coal mining—better maintenance methods, wise control of supplies, and active cooperation with labor—were stressed in papers and discussions on the silver anniversary boat trip of the Illinois Mining Institute as the str. "Golden Eagle" sailed the swollen Mississippi, June 4-6. President Carl T. Hayden, general manager, Sahara Coal Co., called the meeting to order and appointed B. H. Schull, general manager, Binkley Mining Co., chairman of the morning session.

The session opened with a report by Prof. Harold L. Walker, department of mining and metallurgical engineering, University of Illinois, concerning mining students who receive aid from the institute and from the Peabody Coal Co. This aid is to be continued. Dean Charles Thompson, University of Illinois, followed with a statement that his group of war planners had completed its work and had submitted the best report on natural resources that had gone to Rubber Coordinator Jeffers. Furthermore, Governor Green of Illinois is formulating plans for a scientific move to help the people of Illinois adjust themselves to the difficulties of post-war conditions.

Robert M. Medill, director of the Illinois Department of Mines and Minerals, disclosed that the national safety movement, with \$5,000,000 to spend, has for the first time given the coal industry a part. Thomas Moses, retired president of the H. C. Frick Coke Co., has charge of the coal section.

Storekeeper Reminisces

A history of the evolution of a storekeeper from mule days, when annual rations of 510 mules called for 25,000 bu. of corn and 750 tons of hay, to strip mining with a perpetual inventory of huge stocks of mechanical and electrical supplies, was presented by A. N. Stone, warehouse manager, Sahara Coal Co., Harrisburg, Ill., under the title "Observations in Storekeeping Methods Over 37 Years." "Art" began June 6, 1906, as a weigh boss with the O'Gara Coal Co., then owning 14 mines acquired shortly before from miscellaneous owners. Mining then was on the solid. Before the whistle blew, Art helped the clerk with orders for powder and other supplies. A set of miner's tools consisted of grip-bar drilling machine, shovel, pick, coal wedge, grip wedge, blasting barrel, cartridge pin, roll of blasting paper, keg of black powder, box of squibs and a lard-oil lamp. Visiting an aunt after Art's first baby arrived, she insisted on buying one of the "little coffee pots," which the lamps resembled, for the baby to play with.

In 1907-8 several of these mines were electrified, using McEwan and Skinner

engines belted to Morgan-Gardner d.c. generators. Locomotives and cutting machines followed. Cutting machines were condemned forthwith by miners in ungloved words: "A machine like that can never cut coal." But, "comparable to a Model T Ford, they did cut hundreds of thousands of tons of coal. If one broke down it could be repaired at no great expense," declared Mr. Stone.

The last day of March, 1910, ended a miners' contract period. At 1:30 that day a hoisting rope broke at Art's mine just as the dumper reached for the check. The storekeeper vanished. G. S. Thomas, superintendent, ordered Art to take over. Thus began 33 years of storekeeping. As supplies were getting to be important, Mr. Thomas said: "This is a good time

Keeping Step With Coal Demand

	Bituminous Coal Stocks		
	Thousands Net Tons	P.C. Change— From From	
	May 1 1943	Apr. 1 1943	May 1 1942
Electric power utilities.	19,703	+2.6	+33.4
Byproduct coke ovens.	9,730	-1.2	+15.7
Steel and rolling mills.	1,161	+3.7	+10.6
Railroads (Class 1)....	13,175	+8.4	+21.8
Other industrials*.....	28,156	+0.2	+35.9
Total.....	71,925	+2.1	+29.0

Bituminous Coal Consumption

	Thousands Net Tons		
	April 1943	March 1943	April 1942
Electric power utilities.	5,497	-7.8	+16.5
Byproduct coke ovens.	7,496	-2.0	+4.5
Steel and rolling mills.	937	-10.4	+8.6
Railroads (Class 1)....	10,764	-7.9	+6.2
Other industrials*.....	13,886	-8.4	+10.4
Total.....	38,580	-7.1	+11.7

* Includes beehive ovens, coal-gas retorts and cement mills.

Coal Production

Bituminous	
Month of May, 1943, net tons....	47,855,000
P.c. change from May, 1942.....	-0.01
January-May, 1943, net tons....	250,244,000
P.c. change from Jan.-May, 1942..	+5.5
Anthracite	
Month of May, 1943, net tons....	5,223,000
P.c. change from April, 1942.....	+7.8
January-May, 1943, net tons....	26,103,000
P.c. change from Jan.-May, 1942..	+7.0

Sales of Domestic Stokers vs. Oil Burners

	Coal Stokers	Oil Burners
April, 1943.....	1,932	1,056
P.c. change from April, 1942.....	-79.8	-78.3
Jan.-April, 1943.....	7,786	6,556
P.c. change from Jan.-April, 1942.....	-77.6	-82.3

Index of Business Activity*

Week of June 19.....	208.2
P.c. change from month earlier.....	+1.2
P.c. change from year earlier.....	+15.3

* Business Week, June 26.

Electric Power Output†

Week ended June 19, kw.-hr....	4,098,401,000
P.c. change from month earlier....	+2.7
P.c. change from year earlier.....	+19.4

† Edison Electric Institute.

to learn, for there will be a long strike. That prediction proved true, as the strike lasted until the following September. George Lott, widely known in the Middle West as an "affable service man," did much for Art in this interval.

Mules still gathered coal. "Some were as large as they get to be and some were just as small as could be had, depending on the height of the coal." Idle mules were used to deliver supplies to the various mines, which were one to eight miles away. The long trips took a day, using one or two teams to a wagon, depending on whether the roads were dry or miry mud. Outlaw mules—those that refused to work underground—often made the best road teams. Today, one truck can do more in seven hours than four teams did at that time in eight hours.

Mechanical developments continued; so did improved methods of mining. The conveyor loader came and went. Mechanical loading took its place. Strip mining, then slope mines came into fashion with the Sahara Coal Co. Shaft mining dropped out. Then the war came. All these changes multiplied the problems of the storekeeper. Stripping operations brought a vast quantity of "a new line of supplies."

An interesting incident of the 1937 flood, which brought the Ohio River 25 miles on the Illinois side, has to do with the recovery of equipment from Sahara No. 3 mine. The mine was flooded through the main shaft and also by breaking in of an old shaft that had been filled. When the mine was pumped out accumulations of slimy mud, it was revealed, had prevented penetration of water into the mine workings. Slopes were then sunk at outlying points where several cutting and loading machines were recovered, and, "believe it or not," one loading machine was high and perfectly dry, despite 10 ft. of water over the ground surface.

Sees Far Too Many Supplies

In discussion, one man declared that the "haves" are on the best end of the argument, but another insisted there are 100 percent too many supplies in a warehouse. The latter, a superintendent, admitted he had the final say on orders and is not hampered by a Chicago purchasing agent. He keeps supplies upstairs where they are not too handy and will add a night man for better control. He notes material that moves, knows the total stock value each day and—will lend to his neighbors.

A Goodman salesman related that in Joe Leiter's early days in the coal industry one of his men asked for two breast machines. Back in Chicago, Joe ordered a carload. Mr. Goodman telephoned: "We will come over and help you decide what you need." To this Joe replied: "I am not interested in talking; I want a carload of breast machines." He got them. Incidentally, the relator of this story said of today: "I think the worst is over."

The latter statement was supported by Prof. Walker, who suggested: "Eliminate the need of new parts by proper maintenance" and "we don't have to have some of the hardening materials. There are substitutes. Civilian production is start

ing; moving 50 miles a week east to west. The storekeeper is going to have an easier time."

One mine still has supplies bought in 1917 and "we are again approaching the same condition on things we don't need so badly—an after-the-war problem to face." This situation was verified by another storekeeper in these words: "Getting is the big idea, so inventories grow. . . . We overlook reclamation."

Introducing Byron Somers, superintendent, Truax-Tracer Coal Co., Canton, Ill., Roy L. Adams, chairman of the afternoon session, said: "There are many operations about trip mines that are of interest to shaft miners."

In his paper, "Strip-Mining Progress," Mr. Somers declared: "Cooperation and high morale among miners and supervision is essential. . . . We have found the suggestion box is not satisfactory, but if the foreman or other supervisory person will listen to suggestions given by miners, many helpful ideas will be uncovered. . . . The miner will feel he is a necessary part of the organization if someone in authority listens to him and respects his judgment."

Move Shovels on Own Power

Progress, said Mr. Somers, consists of four interdependent elements: tonnage, a better product, a competitive cost, and safety. The system described here has enabled the Fiatt mine to operate six days a week for seven consecutive months without a day of lost production. The present Fiatt mine operation has absorbed the production equipment from the St. David mine, which had to be abandoned because of lack of a coal washery. Shovels were transferred from St. David to Fiatt under their own power. A portable substation was rented from the power company. This was tapped into the 33,000-volt high line every 4,000 ft. The move was made across railway tracks and highways without material damage.

Production equipment consolidated in the enlarged Fiatt pit (see p. 55 of this issue) delivers coal to a new transfer station 1,000 ft. out from the central entrance to the pit. Here the coal is divided, part of it going by narrow-gage track to the washery and the remainder being loaded into standard railway cars after the crusher and screen preparation. The railway cars go to the transfer station over a three-rail track that accommodates the two types of cars. Besides the fleet of narrow-gage locomotives a standard-gage 65-ton General Electric diesel-electric locomotive serves the double duty of pushing up a 2-percent grade for the 16-ton cars to the washery and handles all the switching of railway cars into and out of the transfer station.

Most pit equipment is more than six years old; therefore maintenance is stressed. Maintenance facilities are set up at the transfer station. This includes a blacksmith shop, two portable arc-welding sets, cutting torches and some supplies. The St. David warehouse is being moved to this point, after which all shovel repairs will be made here, which is three miles nearer the pit than is the main shop.

WEST VIRGINIA TRACK EQUIPMENT IS GOOD . .

With the advent of heavier track mounted loading and cutting machinery it has been found necessary to provide the rails which bear this load with heavier support. Many room tracks which have given trouble may be equipped with too light a tie. A heavier tie might remove such maintenance troubles.

The West Virginia Rail Company has a weight of tie to suit any service demands. Weights range from the light A1 tie, weighing 1 1/4# per foot to the heavy H3 tie weighing 5# per foot. This H3 tie is especially designed for 30# or 40# rail and for the heaviest room track service. It is furnished with either plain or cupped ends. Where suitable bottom conditions prevail, the cupped ends will assist greatly in maintaining track alignment.

... and correct installation makes it even better!

Modern mining demands the best materials, workmanship and design in track work. West Virginia builds high grade, modern track work and their Engineers are glad to give you obligation free consultation service.

Everything in Trackwork

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—for Fine Mesh Screening

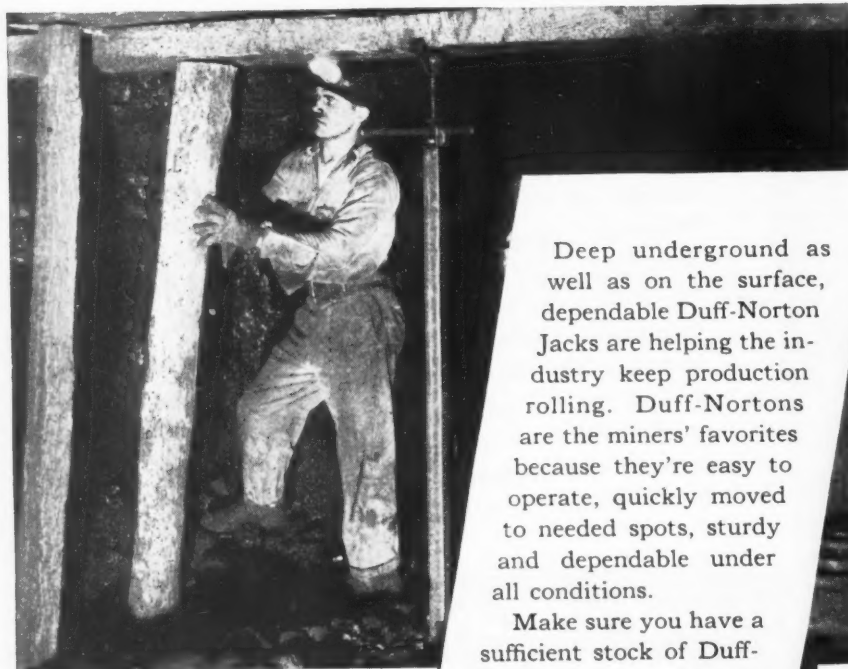
Leahy screens are the logical choice of progressive mine operators everywhere because they increase production . . . cut operating costs. Built to give long, economical service . . . low power consumption (only 1/2 H.P. under maximum load) . . . quicker make ready and replacement of jackets . . . more accurate sizing . . . and capacity. Investigate these advantages today. Write for our bulletin illustrating and describing these screens.

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As a further aid to prompt maintenance, each stripping shovel carries:

A complete set of dipper teeth, keys and wedges.

1 repaired and built-up latch bar; repaired inserts.

1 each trip motor rotor, pinion, crank gear, power cable and dumping cable.

1 repaired counterweight sheave with bearing assembly.

1 cutting torch and hose to reach any point on the shovel.

1 bench grinder.

Miscellaneous bolts, pins, clamps, brushes, etc.

Ten years' records proved that yearly delays from changing dipper teeth, cables and latch rigging totaled more than the delays from major stripping breakdowns. Hence this closely knit maintenance set-up. With electric heaters installed in the dipper handle of the Bucyrus-Erie 950-B stripper in 1939, only one dipper handle has been broken since. Freezing of wet clay in the dipper has been eliminated by a similar method of heating the sides and door (Coal Age, September, 1941, p. 53).

Truck-Rail Haul Justified

Six years of combined truck and rail haulage has justified itself. Rail haul is cheaper only where tracks are moved at longer intervals than three to five years. Truck haul at Fiatt mine is limited to 1½ miles one way, most of which is on the coal. Truck roads are more expensive to build and maintain than rail tracks. At this mine the ramp, with a 3-percent grade, leading out of the pit is the expensive part of road maintenance.

The garage, divided into four sections by firewalls, houses all the trucks and locomotives. For fire protection it is equipped with water lines and fire extinguishers. Seven-day shop crews were tried and abandoned in favor of the three-shift idea, which is more economical and better liked by the men. The present garage labor organization, covering locomotive and truck maintenance, includes on the second shift one foreman, six mechanics, one blacksmith and one welder. On the third shift are two clean-up mechanics, who also are responsible for handling water, electrical circuits, fire extinguishers and moving equipment in case of fire.

Discussion was confined to the relative merits of truck and rail haulage. One operator gave credit to circular track layout in stating that narrow-gauge track is cheaper than truck haulage; another stated rail haul is cheaper than trucks in excess of 1½ miles. All agreed that trucks have the advantage on short hauls. Opinion was divided as to the economical limit of truck distance, in which truck capacity and roads exert a big influence.

Good roads, universally approved, are so important for truck haulage that one operator of wide experience declared, "It is a question of good roads." A pit superintendent of many years said: "Good roads may be built of 18 to 24 in. of washery gob, surfaced with 4 in. of 0x2-in. crushed stone to prevent skidding in wet weather." Another said: "Con-

uous road patrol is the important factor in tire life and truck maintenance."

In his paper, "Maintenance of Equipment on Six-Day Week Operation," A. S. Shaffer, chief underground electrician, New Orient mine, Chicago, Wilmington Franklin Coal Co., West Frankfort, Ill., stressed the need for an extra loading machine and locomotive—in the shop undergoing repairs—to facilitate maintenance. Even five minutes' lost time means an interruption of the flow of coal and the loss of 60 to 125 tons, threatening the scheduled 663,000,000 tons for 1943.

To meet this quota, production units must not stop. Repairs must be made on the maintenance shift. Good voltage at load centers is required; circuit breakers must be maintained in operating condition and cables and power lines protected from accident and sabotage. Every important operating unit should be provided with fire protection and rules enforced that will insure functioning. This is especially important with expensive loaders and cutters—which are difficult to replace. A machine ambulance will hasten the return of a crippled machine to its working panel.

Because the war has taken many trained men, more care is necessary in making inspections by the best man available.

"Every appliance which can be installed that will assist in protecting machines from damage and employees from injury will be of the greatest aid in producing the vital product—COAL.

Canada's Coal Scarcity Serious: Not Many Miners Return

One of the most serious scarcity problems in Canada, C. D. Howe, Minister of Munitions and Supply, informed the Dominion House of Commons on June 15, is in coal. So far this year, imports from the United States have dropped 500,000 tons and Canada faces a shortage of 4,000,000 net tons. "We can meet this shortage," he said, "only by increasing Canadian production and by rigorous conservation of existing supplies."

By returning to coal mines every man in civilian industry who had previously worked in mines, by aiding men in the armed forces who wish to return to coal mining to do so, by refraining from drafting into the armed forces any miners now in the mines, it was hoped the estimated production would be increased 3,000,000 tons. There is still a serious fuel-wood shortage, he said, increased production encouraged by the government subsidy of \$1 per cord having been small.

Humphrey Mitchell, Minister of Labor, stated in the House on June 9 that 1,019 placements of former coal miners in mines had been made during May. Answering inquiries on reported selective service plans for moving 200 Pictou (N. S.) shipbuilding workers to coal mines, he told the Commons that he believed the labor needs of the coal-mining industry are more important than those of shipbuilding.

The order requiring all former coal miners engaged in other work to return to mining was disputed for the first time

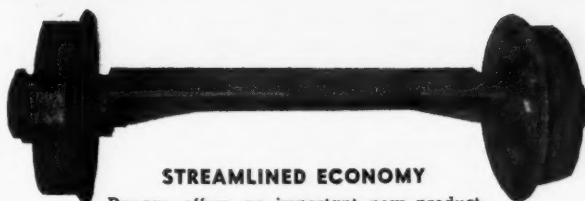
June 7 at Springhill, N. S., when 1,400 miners staged a walkout, leaving three collieries idle. When William Mackie, a former machinist in Quebec Province, was ordered to return to the mines by selective service authorities, the coal miners refused to work with him, asserting there was no shortage of local men to meet employment requirements. Earning more than \$1 an hour, Mackie told a meeting of the United Mine Workers local that he had no desire to work in the mines, where he earns only \$3.90 a day.

C. P. Burgess, managing secretary, Western Canada Fuel Association, stated that it will be a miracle if western Canadian mines can maintain the output of coal they produced in 1942. He said operators

are not optimistic that the national emergency decree of the government will bring back many of the younger men needed. "Many of the men left the mines," he said, "because they could not make a living at it, and present wage rates would be less than they get in other occupations they have taken up."

Saskatchewan mines produced 1,325,544 tons in 1941, dropping to 1,270,982 tons in 1942. They did well in the first three months of this year but slipped in April, so that the total for four months is up only 12,000 tons. In Alberta, the first quarter output of bituminous coal used by railways and industrial users was 870,692 tons, compared with 1,017,799 tons in the same period of 1942, a drop of 147,107

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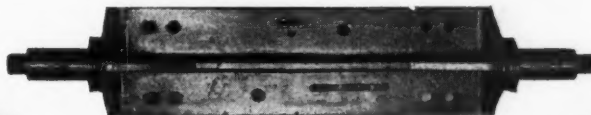
The following results were obtained by placing two axles in hydraulic press, each bolted flat on face of press and bent to a 30° angle on each end of axle: **CAST AXLE** . . . 225 tons—**ROLLED AXLE** . . . 200 tons—neither axle showing a sign of fracture.

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tons. Household production in Alberta, however, was 1,049,764 tons, a gain of 191,971 tons over a similar period of 1942. In April, however, strikes reduced the output. First-quarter sub-bituminous output was 204,261 tons, up 13,346 tons. In British Columbia, output was 615,728 tons in the first four months, a drop of 94,822 tons.

Canada's Munitions Department announced on June 3 suspension of an order freezing all stocks of anthracite in Canada and bituminous coal stocks in Ontario and Quebec. The order, which imposed restrictions on sales and deliveries, was issued four days previously as a result of the strike of United States coal miners. The Canadian Retail Coal Association has asked the Federal Government to limit sale of coal to domestic consumers to 70 percent of last year's orders, to declare the retail sale of such fuel an essential war-time industry and to withdraw its ten-month-payment fuel finance plan. The request was approved by more than 600 delegates, mostly from Ontario and Quebec, attending the 39th annual convention of the association. June 5, in the King Edward Hotel, Toronto.

Mine Rescue Group Organized In Eastern Kentucky

Coal-mining men of the Elkhorn and Big Sandy fields of eastern Kentucky met in Pikeville, Ky., June 16 and organized the Eastern Kentucky Mine Rescue Association with a large membership. C. T. Powell, U. S. Bureau of Mines, was named president of the new organization, formed to save the lives of men in the mines and furthering safety work in general. Its principal purpose is to help educate people in what to do in the event of a disaster in the mines. There is a similar organization in Welch, W. Va.

Other officers are: secretary-treasurer, J. F. Bryson, general manager, Black Star Coal Co.; vice president, Arthur Bradbury, Inland Steel Co., Wheelwright, Ky. F. M. Correll, safety director, Consolidation Coal Co., Jenkins, Ky., is a director. The association will be affiliated with the National Mine Rescue Service.


Safety Champions Crowned

An impressive gathering in the cause of safety took place June 6 at the William Penn Hotel, Pittsburgh, Pa., when 319 officials of the Pittsburgh Coal Co. met to witness the presentation of awards to officials who had completed one or more years without a compensable accident to any of their workmen. Fifty-five officials composing the membership of four clubs known as the Safety Champions. Three-, Two- and One-Year clubs each received an award appropriate to the rank of the club.

Toastmaster at the meeting was Ray Charlier, industrial relations manager, and the guest speaker was Richard Maize, Secretary of Mines of Pennsylvania. J. B. Morrow, president of the company, expressed his appreciation of the fine job being done by supervising officials in such trying times and also presented the

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A safety latch (as illustrated) is available on all sizes and styles of Laughlin Hoist Hooks. The properly designed, stout-sprunged safety feature securely traps the sling—no hazard of accidental slipping or jolting off.



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awards. H. C. Rose, production manager, and R. H. Nicholas, chief inspector, commended the members of the various clubs on their accomplishments and expressed the hope that more would become eligible for membership.

Bureau of Mines Approval

One approval of permissible equipment was issued by the U. S. Bureau of Mines in May, as follows:

Changeable Neon Co.—Type A-8 flashlight; Approval 609; May 14.

Coal-Mine Accident Fatality Rate Higher Than Year Ago

Accidents at coal mines of the United States caused the deaths of 84 bituminous and 16 anthracite miners in April last, according to reports furnished the U. S. Bureau of Mines by State mine inspectors.

With a production of 49,900,000 net tons, the accident death rate among bituminous miners was 1.68 per million tons, compared with 1.49 in April, 1942.

The anthracite fatality rate from accidents in April last was 2.94, based on an output of 5,437,000 tons, against 4.46 in the fourth month of the preceding year.

For the two industries combined, the accident fatality rate in April last was 1.81, compared with 1.77 in the corresponding month a year earlier.

Fatalities during April last, by causes and states, as well as comparable rates for the first four months of 1942 and 1943, are as follows:

UNITED STATES COAL-MINE FATALITIES IN APRIL, 1943, BY CAUSES AND STATES

State	Underground							Total Underground	Surface	Grand Total
	Falls of Roof	Falls of Face	Haulage	Gas or Dust Explosions	Explosives	Electricity	Machinery			
Alabama.....	1	..	3	..	..	1	..	5	..	5
Illinois.....	3	..	1	..	..	..	1	5	1	6
Indiana.....	1	..	1	..	..	..	..	2	..	2
Kentucky.....	8	..	1	..	..	..	..	9	2	11
New Mexico.....	1	..	..	..	..	..	..	1	..	1
Ohio.....	..	..	2	..	..	..	..	2	..	2
Oklahoma.....	..	..	..	6	..	..	..	6	..	6
Penna. (bit.).....	8	1	4	..	..	..	1	14	..	14
Virginia.....	..	..	1	..	..	..	..	1	..	1
Washington.....	1	..	..	..	..	..	..	1	..	1
West Virginia.....	19	2	7	..	2	..	1	31	4	35
Total bituminous.....	41	4	20	6	2	1	2	77	7	84
Pennsylvania (anthracite).....	7	..	4	..	..	..	..	13	3	16
Grand Total.....	48	4	24	6	2	1	3	90	10	100

DEATHS AND FATALITY RATES AT U. S. COAL MINES, BY CAUSES OF ACCIDENTS*

January-April, 1942 and 1943

Cause	Bituminous				Anthracite				Total			
	Number Killed	1942	1943	Killed per Million Tons	Number Killed	1942	1943	Killed per Million Tons	Number Killed	1942	1943	Killed per Million Tons
Underground:												
Falls of roof and coal...	196	204	1,038	1.009	49	29	2,508	1.389	245	233	1,176	1.044
Haulage.....	73	78	.387	.386	8	15	.409	.718	81	93	.389	.417
Gas or dust explosions:												
Local.....	1	9	.005	.044	4	..	.295	..	5	9	.024	.040
Major.....	34	74	.180	.366	..	3	.256	.144	34	74	.163	.332
Explosives.....	6	14	.032	.069	5	3	..	..	11	17	.053	.076
Electricity.....	10	9	.053	.044	2	..	.102	..	12	9	.058	.040
Machinery.....	6	9	.032	.044	..	..	..	..	6	9	.058	.040
Shaft.....	3	4	.016	.020	2	..	.102	..	5	4	.024	.018
Miscellaneous.....	6	16	.032	.079	6	6	.307	.287	12	22	.058	.099
Stripping or open-cut.....	10	11	.053	.054	1	3	.051	.144	11	14	.053	.063
Surface.....	15	21	.079	.104	3	7	.154	.335	18	28	.086	.125
Grand total.....	360	449	1,907	2.219	80	63	4,094	3.017	440	512	2,112	2.294

* All figures subject to revision.



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It changes the current from trolley to reel automatically, eliminating shocks and burns to the operator. Built for 250 and 500 volts, for either single or double trolley and reel service.

INCREASE
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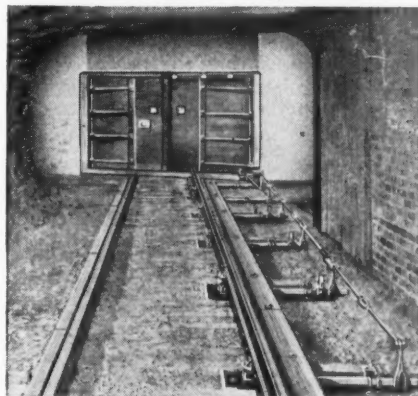


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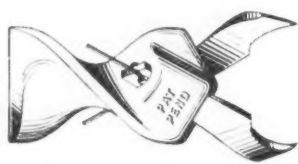
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The McLAUGHLIN two-point Bit is generally accepted as the most satisfactory for small hole drilling. Small holes can be drilled faster with lower power consumption and require fewer dummies in the shooting.



One other important feature of McLAUGHLIN Bits is that they are positively held in the head—vibration or sticking never causes them to drop out. McLAUGHLIN augers, heads, and bits are stocked and sold by mine supply houses in all the major buying centers serving the coal mining regions.

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Joliet, Illinois

Coal Interests Watch Efforts To Tax Ohio River Barges

Coal, oil and other interests which move bulk products on the Ohio River by barge are watching with interest the efforts of six Kentucky counties along the river to establish a franchise tax on barge lines. In view of the fact that the Ohio is a navigable stream with a system of locks and dams providing an all-year 9-ft. boating stage constructed at the expense of the Federal Government for public transportation, with no aid from the counties bordering the river, there is much speculation on how the counties can claim any rights in the matter of franchise taxes.

The Ohio River Co., barge line operator of Cincinnati, a West Virginia corporation, is defendant in an action for collection of taxes, said to be the first attempt of counties to assess such operations. The State Tax Commission, at Frankfort on April 28, voided the assessments on a legal technicality, the record showing that notices of assessments as fixed by county boards of supervisors had been sent out by registered mail instead of being delivered in person by county officials.

Study Coal Possibilities On Vancouver Island

Possibilities of the coal mines of Vancouver Island are being studied anew by the Dominion Geological Survey. Dr. A. F. Buckham, of the Geological Survey, has arrived in Nanaimo to proceed with a geological study of the coal areas on the island, including those of the Nanaimo area, Cumberland and the Sable River field. This action follows strong representations from the city of Vancouver on recommendation of the Council special committee, which presented a brief furnished by W. B. Timm, director of the Department of Mines, Ottawa, with a 20-year old estimate of island coal deposits.

The city brief declared that the Vancouver Island coal industry should be given sympathetic consideration and pointed out that to date it had produced coal worth well over \$300,000,000. The position now is that in Nanaimo and vicinity, Reserve No. 1 and Northfield mines have been worked out. The operating company has taken up a mine in Alberta to augment its supplies.

Attention is being given by Canadian Collieries (Dunsmuir), Ltd., to measures for extending the life of the coal-mining industry in the Nanaimo area. R. H. Plommer, general manager, said at a conference in Nanaimo. The mines there have been in operation more than 90 years but in recent years they have furnished a decreasing proportion of the coal mined on the island. Mr. Plommer advised the conference, which was attended by E. C. Carson, Minister of Mines, that his company is keenly alive to the desire for perpetuation of the Nanaimo coal fields. At present it has two operating mines in the area and has two prospects under examination.

CONSERVE
*Shoes -
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Hercules Augers

Ideal for modern high speed electric drills—withstands whips and torsional strains. Flat hard and tough as whalebone. Drills faster—drills more holes with resharpening—outlasts four to five ordinary drills. Recommended for the hardest jobs. Up to 3" diameters—up to 16 ft. in length.

Black Diamond Augers

Carefully made from high-carbon crucible grade steel—heat-treated to obtain as much hardness and toughness as possible, to prevent broken tangs and points. Furnished up to 2" diameters—maximum over-all lengths 16 ft.

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Originally developed for use with hand drills. These augers work best at hand drilling drilling holes under stumps and ditch blasting. Up to 2" diameters from oval steel, 1/16" thick, and maximum length of ten ft.

Call on us for any type auger you may require in your operations. We specialize in manufacturing the better grade alloy, heat-treated augers. Write, wire or phone for details concerning sizes, prices, deliveries, etc.

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Pennsylvania Executive Acts On Coal Legislation

Among legislative enactments acted upon by Governor Martin of Pennsylvania in early June were four of interest to the coal industry, three of which were approved and one vetoed. Those approved were:

Inclusion in the appropriation for Pennsylvania State College for the new biennium of \$60,000 for coal research, this sum to be augmented by \$30,000 from the coal industry of the State.

Heyburn bill requiring that every foreman, assistant foreman and fireboss in coal mines of the State shall be considered "an officer of the Commonwealth."

Measure to increase from one to two the number of apprentices permitted to work with certified miners in bituminous mines and reduce from two years to a year the period of practical experience or apprenticeship necessary for a soft-coal miner to be certified.

Vetoed as unnecessary was a measure calling for a six-member joint legislative committee to study strip mining in Pennsylvania and present remedial measures for consideration by the 1945 General Assembly. The Executive pointed out that the Mines Department and Joint State Government Commission "both have ample authority to make the survey, investigation and recommendations."

New Republic Operation Makes First Coal Shipment

The first shipments of coal are being made from the new mining operation of the Republic Steel Co., Road Fork, Ky., near Hellier, in the Pike County coal fields. The company is shipping via a short-line branch of the Chesapeake & Ohio Ry. up Road Fork, recently completed. In the area are large operations of such companies as the Inland Steel Co., Wheelwright; Wisconsin Steel Co., Benham, and the United States Coal & Coke Co., Lynch.

Smokeless Briquet Patented

A simple combination of bituminous coal and fusain will produce a briquet fuel which complies with the demand for smokelessness, according to its inventor, Robert James Piersol, Champaign, Ill., who has received Patent No. 2,321,238 for the idea. Tests made with the briquet show that a combination of high-volatile bituminous coal with fusain will burn successfully with little smoke; the more fusain, the less smoke. Forty percent fusain in the briquet is said to make it absolutely smokeless.

New Preparation Facilities

MONAHAN COAL Co., Forksville, Pa.—Contract closed with Wilmot Engineering Co. for one Type A Simplex jig; feed capacity, 12 to 15 tons per hour.

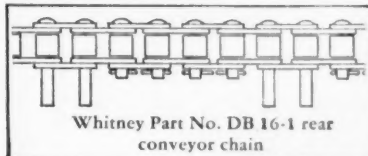
LOCUST COAL Co., Shenandoah, Pa.—Contract closed with Deister Concentrator Co. for one SuperDuty Diagonal Deck No. 7 coal-washing table to treat rice coal.

WHITNEY Mining Chain & Parts



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"pour more coal"
on the Axis**

To keep mining equipment in constant operation, *more duration* is built into Whitney Heavy Duty Roller Chains, Universal and Straight Line Loader Chains, Sprockets and Couplings. And every part is fortified with the uniform high strength of Whitney alloy-armored steels. So order all your mining chain and parts from Whitney Catalog V-153.



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DANVILLE, ILLINOIS

Smoke Preventionists at Pittsburgh Canvass "No More Smoke" as Post-War Objective

Relative Smoking Tendencies of Coals—What Smoke Really Is—How to Collect, Size-Analyze and Burn Fly Ash—What Railways Can Do to Abate Smoke and What the City of Rochester Has Done Already

IN THE clear atmosphere of an almost regenerated yet not altogether pellucid Pittsburgh, the Smoke Prevention Association of America held its 37th annual convention, June 9-11, to plan ways of reducing the obnoxious "smog," dust and dirt that accompany the combustion of all kinds of fuel, confident that the subject will be a major post-war problem, even though for the war's duration, as Cornelius D. Scully, mayor of the city, remarked at the opening session, drastic enforcement just now is being eased a little because priority regulations are making it difficult to obtain the equipment needed for perfecting combustion.

Every little while, however, the sessions would wander from the contemplation of smog, and speakers would refer to the need for economies in fuel consumption during the war and to the manner in which they best can be effected. A Pittsburgh councilman, A. F. Wolk, predicted that Pittsburgh in the future would be the cleanest of cities and that the railroads, which he said were now unrestrained, would find that greater cleanli-

ness in the city would so enhance Pittsburgh's industrial activity as to compensate them fully for the investment thus made necessary.

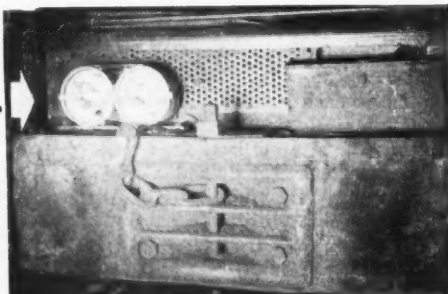
Three Essentials in an Anti-Smoke Program—Success in reducing air pollution, declared M. J. Ream, vice president, Civic Club of Allegheny County, and chairman, United Smoke Council, can be attained only by having: (1) men of science to find means of burning fuels smokelessly, (2) legislators that have been properly informed as to smoke-abatement needs and (3) intelligent enforcement. The only hope for success is in an effort backed by the entire community. Newspapers, political leaders, business, including coal men; the Jones & Laughlin Steel Co., industrialists and the Manufacturers' Association had all cooperated in urging enactment by the legislature of suitable laws.

Vanishing Oil Supply

Less and Still Less Oil—Before the war, declared A. B. Wolle, chief engineer, District No. 1, Petroleum Administration for War, New York City, this country produced 63.2 percent of the world's oil, yet today inventories of oil in the United States are at a low ebb. The speed at which oil reserves were being exhausted when this country entered hostilities was even then so great that, if merely continued, it would have drained the pools of available oil in 14 years, at the existing rate of discovery. The stocks of oil on hand in the Eastern seaboard are in need of replenishment. The public on our Eastern coast and even the armed forces in North Africa cannot expect to draw on Iraq, Persia or other Eastern points for their oil as these supplies are already earmarked.

At the Bottom of the Barrel—Our East coast cannot rely on tankers, and it is already scraping the dregs from its storage tanks. It has been consuming daily 1,400,000 bbl. of oil and of this quantity 600,000 bbl. of oil represents a daily deficit which has had to come from stock. In the future, America will face not only a shortage in its East coast deliveries but a disturbingly deficient production. Why not, then, it may be asked, draw more heavily on the present wells? The answer is that to allow the oil to flow without restriction would result in the loss of productive capacity and eventual ruin of wells. Sixty percent of all our overseas shipments have been oil. Coal also is greatly needed because, with every advance, whether in Africa or Europe, coal has, or will have, to be supplied for the operation of the railroads, seized or constructed. By autumn, revealed R. J. Boyink, fuel service engineer, Standard Oil Co., the needed production will be 1,700,000 bbl. daily. **Could Save Four Weeks' Coal Production**

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• Serious accidents can result from moving trips when headlights fail on your locomotives. TWINLITE prevents such accidents because these headlights automatically switch over to battery power on failure of primary power source. Should one light burn out it has no effect on the other light.

Low voltage allows heavier filaments to better withstand the heavy duty

requirements in the mine. Balanced 6-12 volt system thru a battery charged directly from the trolley reduces filament replacement costs.

TWINLITE has all the features of the most modern automobile headlights. Mountings vary with locomotive. Lights can be separated. Designed with sealed beam lamps built by General Electric.

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tion Annually—"There is no reason," asserted K. C. Richmond, editor, Coal-Heat, "why 50,000,000 tons of coal and much oil and gas should be produced and transported and then wasted by improper use." Steps should be taken to reduce needless heat losses by inspecting, cleaning, repairing, adjusting and properly operating all the various types of heating equipment. J. F. Barkley, chief, Division of Solid Fuels Utilization for War, U. S. Bureau of Mines, had declared in April, 1943, in Coal-Heat "that effective effort would improve the use of at least 300,000,000 tons of coal per year 10 to 15 percent."

Have Done Much and Can Do More—In 1919-20, said Mr. Richmond, railroads used 170 lb. of coal per 1,000 gross ton-miles of freight service and today they use only 111 lb., a 34.7 percent reduction since World War I. Per passenger-train car-mile, the quantity of coal used has dropped from 18.6 to 14.9 lb., or 19.5 percent. In the utility field, 1.3 lb. of coal now does as much as 3.2 lb. did in 1919, a reduction of 59.4 percent. Quantity of coking coal per gross ton of pig iron has dropped from 3,577 to 2,828 lb., or 20.9 percent.

Saving Coal Cuts Transportation—A ton of coal out of every five used for domestic heating is needlessly wasted and half of these losses could be prevented at little or no expense to the fuel user. Merely cleaning the heating plant can cut heat losses 5 percent, and repainting aluminum- or bronze-covered radiators will increase their efficiency 9 percent.

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"PENNSYLVANIA" TYPE "K" SINGLE ROLL COAL CRUSHER

With this advanced design, in rugged STEELBUILT construction, far more accurate sizing is possible to meet Code requirements through quick adjustability, in a range from $\frac{1}{4}$ " to 8".

Further—real protection is provided by improved Safety Toggle Equipment, which quickly passes Tramp Iron, and instantly returns Breakerplate to crushing position.

Seven (7) sizes afford a capacity range from 50 to 1000 tons per hour.

Send for Bulletin No. 2006.

Also,—"PENNSYLVANIA" BRADFORD BREAKERS, BRADMILLS, GRANULATORS, HAMMERMILLS

PUT YOUR COAL PREPARATION PROBLEMS UP TO US.

PENNSYLVANIA CRUSHER COMPANY

Liberty Trust Bldg. Philadelphia
Representatives in Principal Centers.

Bear in mind that heat savings are not only coal savings but railroad-car, track, truck and rubber savings also, and they leave these facilities available for the prosecution of the war.

More Than 90 Percent of House Plants Out of Order—In 64,000 domestic-furnace inspections, the Koppers Co. found less than 10 percent of the furnaces in satisfactory condition. The Chicago Department of Smoke Inspection reports that 26,785 annual fuel-burning equipment inspections resulted in sending 9,248 repair or operating notices to building owners. In Atlanta, Ga., over 90 percent of the heating plants inspected resulted in recommendations by the Smoke Abatement Bureau; over 50 percent of the equipments were in such serious need of repair that they could not be fired efficiently and smokelessly without reconditioning.

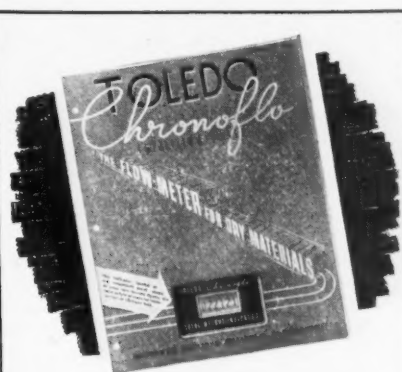
Stacks Too Small for Coal

Use of natural gas, declared Jacob Graff, Graff Bros., Inc., Pittsburgh, Pa., had caused the erection of flues of inadequate size for coal burning. Most of the flues in Pittsburgh were smoke producers. With a good flue, large, tight and tall enough not to be subject to down draft, 70 percent of the smoke should be burned. Once flues got to be small, the small-flue habit became established and was continued when houses were being built in which coal was to be used for fuel. Flue standards are greatly needed.

Errors in Sampling—Variations in coal quality, asserted H. F. Hebley, product-control manager, Pittsburgh Coal Co., make uniformity in coal analysis impossible. It has been shown that when the ash content decreases, the variability in the analysis also decreases, which fortunately makes for more uniform analyses of the coal from the Pittsburgh bed. When U. S. Bureau of Mines standard methods of reducing samples are used, each sample requires 11½ man-hours of manipulation. This is not worth while, for the errors are rather in taking the sample than in breaking it down, and the analyst can do a much better job than the sampler.

Histograms Show How Inevitable Are Variations in Analysis—Mr. Hebley showed histograms in which the number of observations of ash content falling within a certain range are plotted against ash content percent and showed how closely they duplicate curves of probability, with, however, a widening of the base on the side toward the higher values which occurs because no coal is ever absolutely pure, whereas some may be extremely impure. This gives the table a slight skew toward the higher ash content. It is impossible to assure the consumer that he will always get all his cars of coal without a single vagrant analysis.

Anthracite Never Smokes—Coal with 2 to 8 percent of volatile matter will burn absolutely without smoke, declared Dr. H. J. Rose, senior industrial fellow, Mellon Institute of Industrial Research. Using such coal, any smoke the fire may make will come from the kindling or from accidental contamination in the dealer's yard with bituminous coal, as anthracite is seldom treated with oil. Smoke tendencies and low-temperature tar yield show a con-



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WEIGH METERS**

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HYDROTATOR
COAL Preparation UNITS

sistent correlation. Anthracite yields no low-temperature tar in the Fischer assay test; semi-anthracite yields from a trace to 20 lb. of tar; low-volatile bituminous coal, 20 to 110 lb.; medium-volatile, 110 to 210 lb.; and high-volatile, from 210 to 380 lb. per ton, all on a mineral-matter-free basis.

At 950 deg. C., bituminous coal will lose from 14 to more than 40 percent of its weight as volatile matter, and this contains from 20 to 47 percent of the entire heat of the coal; especially do the gases of high-volatile coal carry off heat when subjected to distillation. Because of its moderate tar yield, the volatile matter from lignite makes only a small percentage of smoke.

Finest Sizes Have Brownian Movement—Showing the relation of the diameter of particles to their rates of fall, Dr. E. Berl, Carnegie Institute of Technology, stated that with very fine dust particles, their Brownian movement does more to prevent their settlement than gravity does to aid it. Under the influence of that phenomenon, the small particles falling through the air become charged with electricity and repel one another so that, instead of falling, they move irregularly. Oxidized particles become charged electrically, and these charges, being opposite, cause adherence, not repulsion.

Several Steps in Burning

Air-Borne Hydrogen Atoms and Radicals—In the course of combustion of methane in oxygen or air, carbon dioxide and water are in a sense the end products of the reaction, but that reaction is not so simple as might be imagined. The first change that occurs is the freeing of atoms of hydrogen, which atoms possess more energy than do molecules of the same gas. These hydrogen atoms react with oxygen molecules and form HO_2 (peroxide) radicals. Simultaneously, with the splitting off of hydrogen, the methyl radical CH_3 , the methylene radical CH_2 , the methine radical CH , and the dicarbon radical C_2 are formed. By chain reactions, the methane molecule is finally degraded to carbon monoxide and hydrogen—so-called "water gas" which is regarded as a gas mixture ripe for combustion. In the presence of a wide range of oxygen percentages the two gases in this mixture explode or burn, only acetylene having a wider range.

The methyl radical, CH_3 , is of little importance. It forms the methyl group which stops further polymerization of other radicals. The methylene radical, CH_2 , can give rise to polymerization of chains and rings in which oxygen may or may not be incorporated, but too much hydrogen is in these products to form smoke. The methine radical, CH , lends itself better to the formation of smoke than the methyl and methylene radicals. Also are obtained highly polymerized products of the methine radical or of the dicarbon radical, some being oxygen-free and some containing oxygen. Ring-form radicals also are formed.

A Host of Smokes—Thus, unlimited kinds of carbon smoke may be formed. Probably no two smoke particles are completely identical, and if one starts not

from methane but from more complicated systems like naphthalene or phenols, an unbelievable number of different kinds of smoke may be formed when variations occur in their flames, their reaction temperatures, their times of reaction, the oxygen concentration needed for their combustion, their speed of cooling and in other factors which modify the quantities and qualities of the resulting carbon compounds. Organic material of any kind burned with insufficient oxygen causes polymerization of the radicals into long chains, with or without branches, and into cyclic forms, the latter including rings with or without branched side chains. The formation of smoke is by no means a simple phenomenon. Solids also, when humid, settle more rapidly in the atmosphere than when dry.

With underfeed stokers, use of a lower fusion coal would decrease the emission of fly ash, commented K. H. Bowman, engineer, power section, Dravo Corp. Spreader stokers commonly have a thin coal bed, and the temperature is low, so no clinker is formed. In consequence, much fly material commonly known as "fly ash" is emitted by such stokers, but such material contains much unconsumed carbon. The air usually comes in three directions—through the front wall, the back wall and the grate. This air tends to burn the combustible in the "ash," but some is whisked away unburned.

One of the means of separating fly ash is the Helicoid. The air in the interior periphery of a cone is set in whirling motion at a velocity of 900 f.p.m. Within the cone is another concentric cone in which are slots. Up this inner cone, the furnace gases are made to rise in helicoidal paths and when they pass the slots, the dust emerges and travels to the outer walls of the cone, falls between the two walls and is carried in pipes away from the base of the cone. The speed of revolution, being under 1,500 f.p.m., is not great enough to produce abrasive effects.

The fly ash can be recirculated, and its carbon content given another opportunity for combustion, but if it is stored in the boiler setting and subjected to reflected heat for any length of time, it may burn prematurely and form clinker.

The lighter fly ash is not removed by a dust collector, but this dust is not objectionable, declared Mr. Bowman.

SELF-IGNITION TEMPERATURES OF FUELS

Fuel	Deg. C.
Peat and lignite with 25 to 30 percent of bound oxygen	250-280
Dekahydronaphthalene	280
Hexane	296
Bituminous coal with 6 to 9 percent of bound oxygen	300-400
Cyclohexanol	350
Cellulose	360
Paraffin oil (aliphatic)	370
Ethanol	375
Tetrahydronaphthalene (tetralene)	420
Anthracites with 3 percent of bound oxygen	440
Methanol	500
Bituminous coal-tar oil (mostly aromatic)	600
Naphthalene	620
Benzene	690
Phenol	715

Search for Rapid Size-Analysis Equipments—The lower limit for size analysis by screening is 43 microns, corresponding to the 325-mesh screen, regretted H. C. Dohrman, chief engineer, Buell Engineering Co. A mechanical fly-ash collector will recover substantially all such material, so for tests of such collection, a better way of taking a size analysis is desirable. In the Buell laboratory, the Andreasen method is used, which depends on the time taken for particles of any given size to fall in a fluid. Unfortunately, the thin shells of fused silica inclosing entrapped gas found in quantity in flue dust, and known as "cenospheres," float on the top of the fluid and make the results misleading. Also, some dust particles agglomerate, but this usually can be avoided by using other fluids or adding a peptizator such as sodium pyrophosphate.

Classification by Ascending Air Simpler—The elutriator in which the dust is lifted by rising air is the most satisfactory means of fly-ash analysis. By varying air volume or tube diameter, the dust can be fractionated. Tubes of three successively larger diameters are used; the coarsest dust falls in the first tube, the next finest in the second, the next finest in the third and the smallest size in the filter. The results are converted by Stokes' law to give particle dimensions, but as this applies to homogeneous spherical particles what are obtained are so-called "equivalent particle sizes."

Bad Practice Predominant—Only 2 percent of heating and power plants, declared Carroll F. Hardy, fuel engineer, Coal Producers' Committee for Smoke Abatement, are in good condition and well operated. About 9 percent have faults but are well handled despite their defects, as ascertained in a survey made for the committee. In too many cases, firemen have other duties or are so located that they cannot see the smoke their furnaces are making. They should be furnished a mirror in which they could see the top of the furnace stack.

More Care, Less Cost—Most of the defects are just bad housekeeping, doors off their hinges, etc. In these instances, no one seems interested in the big savings that go with keeping a furnace in good condition. Railroads are peculiarly bad

TO DIRECT SMOKE ASSOCIATION OF AMERICA, 1943-1944

President—Arthur E. Hutchinson, smoke abatement engineer, Cleveland, Ohio. Vice Presidents—W. E. E. Koepler, secretary, Pocahontas Operators' Association, Bluefield, W. Va.; J. Cooney, locomotive engineer, Atchison, Topeka & Santa Fe Ry., Oak Park, Ill. Secretary-Treasurer—Frank A. Chambers, chief smoke inspector, Chicago. Sergeant-at-Arms—W. H. Dempsey, Chicago, Milwaukee & St. Paul R. R., Milwaukee, Wis.

Only the second vice president is a new appointee. Cincinnati was chosen as the 1944 convention city.

offenders, as the smoke is emitted only about 18 in. above the stack, and the locomotives carry the pall all along the line, and at so low a level that the smoke is more intimate in its approach than that from chimneys. Better combustion pays dividends. Inspections, therefore, are profitable to the inspected and for such service they should be willing to pay a fee.

Overfire Air—High-pressure air jets supplied by power-driven fans have been used in furnaces, said Harry Carroll, head, mechanical engineering department, Commercial Testing & Engineering Co.: (1) to create enough turbulence to prevent the gases over the fire from separating into strata, (2) to dispense with or shorten the refractory arches introduced to effect a similar purpose, (3) to enable furnaces of limited volume to deliver more steam and do it economically, and (4) to burn out the combustible still retained by the fly ash. Industrialists are afraid that coal may be allocated, but, although they anticipate that such allocation will be temporary they wish to provide that any coal that they may have to burn can be consumed without making smoke and that the furnace will give satisfaction when a return is made to the fuel they formerly used. They want to do the revisionary work in the least expensive way, and so have favored steam jets instead of the more expensive, yet economical, fans.

Avoid Erosion and Clinker

In introducing overfire air, care must be taken to avoid erosion of brickwork or formation of clinker; for this reason, the air jets must not impinge on the brickwork or fire bed. Overfire air is not so helpful with chain-grate stokers as with other forms of combustion equipment, except where the grates are heavily overloaded or automatic control is provided. Rifling the barrel of steam jets is a modification of value in the use of overfire air, for with it the air is widely diffused.

Overfire air has been held back in its application to locomotives because of its excessive noise and because of a lack of performance data, declared E. D. Benton, fuel engineer, Louisville & Nashville R. R. In the past, the locomotive engineer and fireman have been ill-disposed to operate overfire devices because they were so noisy, but this noise readily can be reduced.

Because of a lack of performance and design data, many locomotives were equipped with excessive numbers of steam air jets whose steam orifices were too large, resulting in steam consumption often five to ten times that necessary to abate smoke. Properly designed steam air jets will prove helpful in preventing honeycombing at the flue sheet because they promote short-flame burning. On the other hand, excessive overfire air may cause the fuel bed to clinker. The steam air jet is a most effective tool, but it cannot do the whole job—a cooperating engine crew is still the most important part of smoke prevention.

Battelle Furnishes First Basal Data on Overfire Air—Recording the first studies made leading to proper design of overfire air ducts, R. B. Engdahl, Battelle Memorial Institute, said that the jet is shortened when too much air is admitted to it.

Did You Say $\frac{1}{2}$ Cent per Ton of Coal?

That's What I Said— $\frac{1}{2}$ Cent!



An imaginative question with an equally imaginative answer? Not at all. It's a question that could be asked by any mine superintendent in regard to the cost of making his mine free from dust hazards by complete treatment with COMPOUND M.

And the answer—"1/2 cent per ton of coal mined"—is what the average user could honestly answer. For that's about what it costs if COMPOUND M is sprayed at all points where dust might arise—face, loading machines, dumpers and haulageways.

Investing in a COMPOUND M treatment plan is cheap insurance.



The use of COMPOUND M in dust treatment in coal mines has the approval of the U. S. Bureau of Mines.



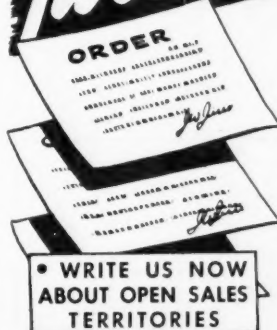
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TERRITORIES

In consequence, at a point where the requisite air already has been entrained, it is arranged that the jet shall enter an "air tube," thus steadying the flow. Turbulence is needed above the fire, but the jet should not itself be turbulent. The air tube should be $7\frac{1}{2}$ diameters long and its nozzle should be set one air-tube diameter back of the throat of the air tube. With the performance of a flaring bellmouth orifice rated as 100, that of the cone orifice is 98 and that of the free mouth 89.

Venturi Diffuser Not Helpful—A 14-in. air tube $7\frac{1}{2}$ diameters long having its performance rated at 100, a tube of the same length and size with a venturi having a 10-deg. divergence, also $7\frac{1}{2}$ diameters long, should have its performance rated at

125, and a 2-in. tube, $7\frac{1}{2}$ diameters long, should be rated at 160. The diffuser decreases jet length and turbulence and, therefore, is undesirable. A 2-in.-diameter 45-deg. elbow was added to two 2-in.-diameter air tubes, both 2.9 and 5 diameters long, both less than the optimum length. This raised the entrainment 3 to 5 percent. In all cases a 90-deg. elbow decreased entrainment.

The noise at a point 34 in. from the outlet of the nozzle was 83 decibels with dry steam flowing through a $\frac{3}{4}$ -in. nozzle under a pressure of 45 p.s.i., but with the steam jet surrounded concentrically by a box at least $\frac{1}{4}$ in. from the wall and the air entering the steam jet through the absorbent between wall and box, the noise

was reduced to 70 decibels, a reduction in noise intensity of 95 percent, an intensity of sound equal to that in many boiler rooms and busy city streets. Other data also were presented.

Railroads Prove Cooperative—Within the city limits of Pittsburgh, said W. H. Kimberly, smoke inspector, the railroads use on all their engines coal of such volatile content as the city requires. These companies have been most cooperative at all times and of their own volition have provided their own smoke inspectors to collaborate with the city's inspectors for the reduction of smoke.

The railroad inspectors have no police powers but have power of supervision over locomotive crews and can report, criticize, instruct or caution. Inspectors report violations and bad conditions so that supervising officials can and do take action. On all locomotives, fires are lighted by oil torches applied from above the coal bed. The bed, when fires are started, is 4 to 8 in. thick. Almost all engines are equipped with stokers and arches. It is difficult to prevent smoke, for there are heavy gradients leaving the city, but the railroads are meeting that situation well. Corrective actions are not listed against a man's record, but reprimands or suspensions are so recorded.

Too Much Steam Makes Smoke

When at Speed, Reduce Throttle Opening—Maximum fuel economy and minimum smoke emission will be attained if the throttle valve is kept properly regulated to suit the load, asserted Samuel A. Dickson, supervisor of fuel economy, Alton R.R. Co. In starting a locomotive with a heavy train the reverse lever is put in the front corner notch, and then the main throttle valve is opened wide by easy stages, thus preventing the jerking of the train, the slipping of drivers and an unsightly emission of smoke that is indicative of poor locomotive operation. This driver slippage tends to tear the fuel bed, clog the flues, distort the machinery and waste fuel. In operation, however, the throttle should not be kept entirely open after the train has reached full speed or is running on a down gradient. It also is better to maintain a slightly longer valve-travel cut-off.

Too Much Afraid of Wire Drawing—A test showed that when a locomotive even in good condition was run with the throttle wide open and an extremely short valve cut-off, the steam pressure was lowered and the water level fell even though No. 2 smoke was being emitted from the stack. Apparently, this was because the draft was insufficient, so that the fire was not hot enough to burn the fuel and raise the needed steam. When the steam was throttled properly and the valve-travel cut-off correctly maintained, the locomotive not only made less smoke but gained water and steam pressure and handled the train more easily.

Smoke often is caused on a stoker, said H. J. Riddle, Pennsylvania R.R., when going downhill at 80 miles per hour. The coal will slide down the stoker, and the cold coal piling over the hot coal will cause honeycombing.

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Not All Deposited Dust Is Sootfall—Too much dust has been attributed to sootfall, declared Ernest Brundage, smoke inspector, Rochester, N. Y. Fifty percent of the Rochester dusts were non-combustible, so the deposits cannot be all soot. He had been making surveys monthly since 1937, using open glass jars set at twelve stations 4 ft. above the general level of the roof tops in various sections of the city, which covers 35 square miles. True, the weights were not taken always on the days appointed, but after taking they were converted to a monthly basis. It was found that when, in the course of the month, there were few wind changes or a number of days of precipitation of rain or snow or large quantities of water precipitated, the dust record was lowered. Of course, in the warmer weather, this is a little less obvious, as the streets are flushed and dust passes to the sewers.

Notable Improvement—Dust deposited,

in average tons per square mile per month, from 1937 to 1942 inclusive (when the survey had to come to an end for lack of gasoline), ran 32, 28, 32.3, 31.2, 27.3 and 25.4. Only comparisons of whole years such as these show progress or the reverse, but monthly figures were taken so as to correlate dustfall to weather conditions; but, in assessing the value of the efforts of the smoke-inspection service, it must be recalled that the plants were more numerous and worked many more hours in 1942; in fact, activity was four times as great in 1942 as in 1937, for many plants had been greatly enlarged and factories out of use for ten years were started on war production. Oil, moreover, was rationed, causing plants to use soft coal. City inspectors present declared that comparisons of the quantities of solids precipitated in various cities are meaningless until better standards of dust collection have been formulated.

have been rapid, there are yet many major problems. That of cleaning slack sizes is common to most regions and is largely unsolved. Problems in reclaiming coal lost in refuse, in sludge, in washery water; in the economical drying of fine coal and in the elimination of plant dust are among those that even now should be receiving the attention of coal producers.

Last Word Not Said on Safety—It was coal that pioneered the safety movement in this country. Perhaps the first organized effort was the enactment, in 1870, of inspection codes in Pennsylvania. It is not too much to expect that in the control of the roof the "rule of thumb" will give way to practices based on geophysical methods. Instruments will be developed that will give continuous records of rock stresses and roof movements which will permit long-range forecasting of breakline falls. Portable equipment will be perfected to test for loose coal and roof slate. Mine roof will be more generally sealed to prevent slate falls. The "if" will go out of safety and only the human equation will remain, and even this in turn will be "licked" by education.

Nor Must Personnel Be Neglected—As in war, so in the coal industry, the results of a well-conceived training program will speak for themselves. Tremendous sums are spent on the reserve officers' training corps to insure sufficient officers of lower rank, qualified to lead soldiers in time of war. It would be wise for coal companies to follow a similar plan. Generally speaking, the success of a company's personnel work may be gaged as much by its liberality in appropriations for training as by any other single item. Dean Steidle concluded with remarks on research and economics.

Classes for Mechanics

Four Courses in Mechanized Mining—Summarizing the work done in the past in the training of employees for jobs as mine foremen and firebosses, D. C. Jones, supervisor, coal-mining extension, Pennsylvania State College, passed to other forms of mining education, saying that at present the college offers training courses in mechanized mining as follows: First, a "preparatory" course in mathematics designed to teach students how to make the calculations they necessarily will have to make in later courses. Next, a "machine maintenance" course, designed primarily for maintenance men, which provides study in the principles and practices of operating and maintaining mechanized mining equipment. This course also can be given with excellent results to groups of mine officials or operators of equipment.

A third course, termed an "electrical maintenance" course, is designed to provide study in the operation and methods of making repairs to the electrical controls used on machines for mechanized mining. Another course is intended primarily for supervisory officials or for those men who are training for such positions. It provides group discussions of problems in connection with a mechanized mine official's work, with job instruction, time studies, operating cycles and operating and cost control as topics.

Company-Sponsored Training Program

Future Development and Education in Mining Foreshadowed at Pittsburgh Institute

Coal Has Other Rivals Besides Oil, Gas and Hydro-Electric Power—Classes in Machine Care, Electrical Maintenance, Supervision of Machine Crews and Coal Preparation Provided by State College

PROBLEMS confronting the coal industry and the necessity for educating everyone engaged in it to meet those problems were subjects presented to the Pittsburgh Coal Mining Institute at its May 28 meeting in the auditorium of the Mellon Institute of Industrial Research.

New Purveyors of Energy—Bituminous coal, declared Edward Steidle, dean, School of Mineral Industries, Pennsylvania State College, is considered the greatest source of stored energy—a resource which wishful thinkers declare is virtually limitless and will be exhausted only after several thousand years. But none of these wishful thinkers speaks in terms of coal of marketable quality, nor do they indicate that in general the production curve since the early twenties has been declining.

None of them recognizes other possible sources of energy, such as the tides, the differences in temperature in the waters of the sea, the atom, heat in the earth's interior, cosmic rays, the stratosphere, or the sun—the last being the source of all energy. Bituminous coal thus has competitors as yet undreamed of. Whether it can hold its own will depend on many developments not yet realized.

Coal Must Do Its Part in World Rehabilitation—Meantime, in the post-war period, bituminous coal has a full share to contribute to the economic rehabilitation of the world at large; first, as a source of energy, second as a raw material for industry. A tremendous debt will hang over our heads; there will be 25,000,000 idle munition workers, thousands of women workers will rebel against returning to home life, thousands of teen-age children must be removed from the streets, 10,000,000 soldiers will be home from the front, thus creating problems more momentous than any the United States has ever yet

faced. Will coal men rise to the occasion?

Two Examples of Extraction Progress—Sufficient experimental work has been done to prove that, with properly designed equipment and capable supervision, a highly successful job in the production of low-cost fuel can be done under extremely difficult conditions. In one southern West Virginia mine, standard shuttle-car and caterpillar loading equipment are used to excavate the coal in a section with a thick rock parting. The coal seam consists of 44 in. of bottom coal, 46 in. of rock parting and 36 in. of top coal. The coal and rock are mined selectively. The shuttle cars and loader are small-capacity, low-seam units, and the auxiliary equipment is crudely adapted to the special job of selective mining and underground waste disposal. Yet results are promising. A production of 20 tons per man on the section has been achieved despite the 60 percent of waste that has to be handled.

A recent development which will lend itself admirably to selective mining is a specially designed "shelf-loader," a high-capacity caterpillar-mounted loader capable of loading coal benches even when 8 ft. above the floor of the seam. This loader is used to load selectively from the top down when conditions are such that the rock partings are too friable to stay in place while the coal underneath them is being loaded. Several of these loaders were installed in Alabama during 1942.

Some Preparation Problems to Be Solved—New methods for burning coal, new uses, and improvements of existing coal-consuming equipment will require coal to be prepared to exact specifications. Coal must be tailored to meet the individual needs of the consumer. Some coal may be pumped direct from mine to market. Though developments in coal preparation

—This mechanized mining program is designed for use as a company-sponsored training program. At least two of the courses require shop facilities, and this means that close cooperation by the sponsoring company is necessary if these parts of the training work are to be successful. Course instructors are selected from among the company personnel, and a separate instructor for each course frequently is necessary so that a specialist may be in charge of certain parts of the training work.

Coal-Preparation Course—The college has still another type of training program—a course on “coal preparation” which deals with the selective mining of coal and its sizing and cleaning in surface plants to meet the requirements of industry for a particular type of coal, or to meet the demand of the public for stoker fuel. This is intended for men who supervise coal preparation, who are working for the sales department, or are engaged as workmen in operating preparation plants. In the last year, four classes have been in operation for three different coal companies, and have trained about 70 men in this work.

Regional Training Centers Foreshadowed—A future development in the training of men in mechanized mining practices may be the initiation of “regional training centers” to augment or even replace the company-sponsored type of program. Such a center, serving a large number of miners, would require a centrally located shop, possibly with classroom facilities, where the equipment and practices used in mechanized mining could be studied. It would be necessary to borrow this equipment from one or more of the mines near the center.

The training work would have to be subsidized in some manner, either by having each student pay a certain fee for each course to cover the cost of rental, supplies and text material, or by having the various companies assume their proportionate share of this upkeep on the basis of the number of employees of each company in the classes.

Employment Stabilization Plan Includes Some Coal States

The War Manpower Commission late in May issued an employment stabilization plan for Region 4, which includes Maryland, North Carolina, Virginia, West Virginia and the District of Columbia. Under this order, no employer in the region may hire or solicit any worker whose most recent employment was in an essential activity unless the worker presents either a statement of availability from his most recent employer or a card from the U. S. Employment Service. No employer engaged in an activity other than essential shall employ, at a higher wage, any worker last employed in an essential activity unless there is no full-time essential job available locally. Workers from outside the immediate areas may be hired only through the local U. S. Employment Service office.

Statements of availability shall be issued whenever the worker is discharged, laid off for seven days or more or is not being used currently at his highest skill or at

full-time employment or “has compelling personal reasons” for changing jobs. Also, “if it is established that the change of employment will add to the effective prosecution of the war, a statement of availability may be issued on the ground that an individual’s wage or salary rate is substantially less than that prevailing in the locality for the same or substantially similar work.” Similar plans have been or will be issued for other regions.

Blames Equipment, Not Fuel, For Excessive Smoke

Improper heating equipment, poor maintenance and an antiquated type of heating stove are the chief causes of excessive smoke in a city, Carroll F. Hardy, manager of the fuel engineering division of Appalachian Coals, Inc., Cincinnati, Ohio, told a smoke abatement committee of the Alabama Mining Institute June 14 in Birmingham, Ala. To correct the condition he recommended a strong ordinance backed by a committee consisting of authorities on various types of smoke producers, such as railroads, apartment houses, hotels, schools and laundries. Education of the public and its cooperation are indispensable, he said.

The type of fuel is not to be blamed for excessive smoke, Mr. Hardy continued. The opinion was circulated that a change in fuel was responsible for smoke reduction in St. Louis, but the truth of the matter, he declared, is that plants were educated to put in better equipment. With one or two exceptions, the speaker said, heating stoves have not been improved in 50 years.

James W. Morgan, who presided, said that apartment houses are persistent offenders in Birmingham. He added that a local war plant has persisted in failing to cooperate in smoke reduction. Mr. Hardy replied that a survey by ACI showed that only one out of 600 plants in the country inspected failed to cooperate.

Housing Program Approved

The Federal Housing Authority is proceeding with construction of 40 new family dwelling units at Superior, Wyo., for employees of the Union Pacific Coal Co. and the Rock Springs Fuel Co. Willard F. Day, regional national housing agency representative, announced final approval of the program late in May.

Freight Rate Cut Deferred

The Interstate Commerce Commission has postponed indefinitely a 10c. per ton cut in coal freight rates from western Kentucky to Chicago and will reopen the case for further hearings. The lower rate, reducing from 35 to 25c. a ton the differential favoring coal shipped from southern Illinois and Indiana over that from Kentucky to Chicago was ordered early this year after extensive hearings. The I.C.C. rejected late in May the pleas of Illinois and Indiana operators and the Attorney General of Illinois to reopen the case.

Start Sinking New Shafts For Berwind-White

Sinking of two 850-ft. concrete lined shafts to the Lower Kittanning, or “B,” seam in the Wilmore basin about a mile south of the village of Wilmore, Cambria County, Pa., has been started by the Dravo Construction Co., Pittsburgh, for the Berwind-White Coal Mining Co. Between 7,000 and 8,000 acres of high-quality low-volatile coal will be developed from the new operation. The main hoisting shaft is down about 60 ft. and grading for the railroad spur off the main line of the Pennsylvania R.R. just east of Wilmore is partly completed. This is expected to become one of Cambria County’s largest producers.

Ask Coal-Act Extension: Costs for 1942 Shown

Although somewhat eclipsed by the Appalachian contract controversy, steps toward a long-term extension of the Bituminous Coal Act of 1937, with amendments, were continued in June. Testifying before the House Ways and Means Committee June 21, Howard A. Gray, Deputy Solid Fuels Administrator, urged extension of the act as a means of insuring continued and uninterrupted coal production. Previously, President Roosevelt transmitted to Congress a budget recommendation of \$800,000 for the Bituminous Coal Division and \$16,000 for the Consumers’ Counsel to permit operations “to continue unimpaired until Aug. 24, 1943.” The request was passed by the House and sent to the Senate.

Applications from six producing companies for exemptions from the bituminous coal code on the grounds that either the coal extracted at their mines is consumed by the producers or that their transactions are not in, or do not directly affect, interstate commerce, were denied early in June. The petitioners were the Valier Coal Co., owned by the Burlington R.R.; Superior Coal Co., Chicago & North Western; Vesta Coal Co., Jones & Laughlin Steel Co.; Windsor Power House Coal Co., West Penn and Ohio power companies; and the Allegheny-Pittsburgh Coal Co., West Penn.

Other witnesses testifying, all of whom favored extension of the act, were Dan H. Wheeler, director of the Bituminous Coal Division; George W. Reed, vice president, Peabody Coal Co.; L. E. Woods, president, Crystal Block Coal & Coke Co., and also president, Operators’ Association of the Williamson Field; Luther Harr, Bituminous Coal Consumers’ Counsel, and Percy Tetlow, United Mine Workers.

Secretary of the Interior Harold L. Ickes announced June 25 that the director of the Bituminous Coal Division had reported to him the preliminary compilations of producing, administrative, and selling costs for the nation’s bituminous coal mines during 1942. The average cost computed in accordance with the provisions of the Bituminous Coal Act of 1937 for the whole United States as shown by the tabulation was \$2.2662 per ton, as compared with \$2.2429 per ton for the 12 months

October, 1941, through September, 1942, the last previous published compilation.

Producing, administrative and selling costs for 1942 and for the nine months January through September, 1942, are shown below:

Minimum Price Area and Producing District	9 months Jan.-Sept. 1942	Calendar Year 1942
Minimum Price Area 1		
Dist. 1: Cent. Pa. and part of Northern W. Va.	\$2.4689	\$2.4907
Dist. 2: West. Pa.	2.3571	2.3848
Dist. 3: Northern W. Va.	2.0043	2.0252
Dist. 4: Ohio	2.0153	2.0176
Dist. 5: Michigan	4.2247	4.3805
Dist. 6: W. Va. "Panhandle"	2.0101	2.0848
Dist. 7: So. W. Va. and Va. "Smokeless"	2.5808	2.6207
Dist. 8: So. W. Va., East Ky., part of Va. and Tenn.	2.3364	2.3620
Price Area No. 1	2.3412	2.3654
Minimum Price Area 2		
Dist. 9: West Ky.	1.5635	1.5793
Dist. 10: Illinois	1.7234	1.7252
Dist. 11: Indiana	1.5899	1.5940
Dist. 12: Iowa	2.8299	2.7764
Price Area No. 2	1.7038	1.7067
Minimum Price Area 3		
Dist. 13: Alabama	2.9215	2.9642
Minimum Price Area 4		
Dist. 14: Arkansas-Okla.	3.6708	3.6628
Minimum Price Area 5		
Dist. 15: Missouri-Kan.-Okla.	2.1288	2.1483
Minimum Price Area 6		
Dist. 16: No. Colorado	2.5803	2.5431
Dist. 17: West and So. Colorado	2.8401	2.8038
Dist. 18: Arizona-No. New Mexico	3.5461	3.6068
Price Area No. 6	2.8210	2.7840
Minimum Price Area 7		
Dist. 19: Wyo., Idaho	2.0261	2.0394
Dist. 20: Utah	2.2133	2.2615
Price Area No. 7	2.1043	2.1294
Minimum Price Area 9		
Dist. 22: Montana	1.4684	1.5080
Minimum Price Area 10		
Dist. 23: Wash., Ore.	3.8485	3.9147
Total, United States	\$2.2528	\$2.2662

New Mines in British Columbia

A new large-scale coal-mining project which is to be in production later this year is the Elk River colliery, near Fernie, B. C., belonging to the Crows Nest Pass Coal Co.

Vancouver (B. C.) interests have purchased the Hat Creek coal mine, about 25 miles from Ashcroft, B. C., on the Ashcroft-Lillooet Road. The new owners are to develop the property for the Vancouver market.

J. D. Snyder Is Dead

J. D. Snyder, 59, Kentucky Division Manager, Consolidation Coal Co., died June 15 in the Jenkins (Ky.) City Hospital after an illness of several weeks. He entered the employ of Consolidation in 1904 and for years was engineer in the Maryland Division. In 1927 he was transferred to the Millers Creek mines, Van Lear, Ky. In 1935 he went to Jenkins and was advanced to assistant division manager. About two years ago he succeeded H. B. Husband as division manager.

Mines Section, Safety Council To Study Roof Falls

Prevention of accidents from the premature descent of mine roof will be presented by three or four speakers, covering hazards in flat beds, pitching beds and metal mines at the first session, Tuesday afternoon, Oct. 5, of the 32d National Safety Congress, Oct. 5 to 7, Chicago. An analysis of the problem in various types of coal and metal mining with emphasis on causes will precede this discussion.

Rock bursts and bumps and methods of stimulating interest in safety will occupy the attention of the session of Oct. 6, Wednesday afternoon. In this employee publications, safety contests and first-aid training will have their innings. The study of employee publications will be presented by Henry H. Null, associate editor, Commentator, Hudson Coal Co., Scranton, Pa., and for this purpose he is desirous of receiving copies of these publications. His paper will be entitled "Methods of Stimulating Interest in Safety Work—Employee Magazines." Provision probably will be made to separate coal- and metal-mining interests at one of these sessions.

Cable Supply Increased by WPB: Forms and Ratings Changed

Changes in forms and in certain ratings were among priorities developments in June, including measures to build up stocks of electrical cable upon which mines can draw. In the latter connection, WPB announced May 26 that it has ordered the major cable companies to ship a definite quantity of cable into their

warehouses each month to forestall possible shortages for either emergency or regular production requirements. Cables accumulated in warehouses will be available for withdrawal only by holders of certificate numbers under P-56, either directly or through equipment manufacturers. The cable will be handled through the regular distributing organization of each manufacturer. The first WPB directive covers Nos. 1, 2, 4 and 6 single-conductor locomotive cable, the same sizes of parallel-duplex mining-machine cable and two-conductor mining-machine cable.

WPB's requirements committees also announced the restoration of the AA-2 rating to avoid creation of a new "super" rating to take care of urgent requirements. Mines and mining machinery manufacturers, however, will continue with AA-1 for maintenance, repair and operating supplies; new equipment orders will continue to be individually rated as in the past; and mining manufacturers will be assigned an AA-2 rating for the third quarter for 50 percent of their production material and components for new equipment and AA-2X for the remainder.

Another WPB action was adoption of a simplified system of identifying forms which is being put into effect as reprinting of present forms becomes necessary. Eventually, it is expected that they will carry on the designation "WPB" followed by a serial number. Meantime, both the old and the new designations are being carried until the changeover is completed. For project ratings, the new form is WPB-617 for all activities under Order L-41. It replaces PD-200. Their use is optional before July 1 and mandatory thereafter.

Mining companies were urged in June to give heed to the instructions of the



"Yeah, I know but—"

Mining Equipment Division in regard to releasing allotments of controlled materials which will not be used in the third quarter. Another announcement points out that a preference rating used on orders placed prior to May 16 for advance allotment of material for the third quarter does not have to be changed, even though a lower rating is finally assigned to the third-quarter allotment.

Appointment of James F. Organ as acting chief of the coal section, Mining Equipment Division, vice D. L. McElroy, now chief engineer for the Consolidation Coal Co., was announced by A. S. Knoizen early in June. Mr. Organ was formerly a consulting geologist specializing in coal-stripping problems and has been connected with division since April 13, 1942. He will continue to serve as chief of the expediting unit set up a few months ago.

C. & O. Orders Locomotives

Ten new freight locomotives have been ordered by the Chesapeake & Ohio Ry. for use in moving coal trains over the Allegheny Mountains between Hinton, W. Va., and Clifton Forge, Va. The new units will be delivered early in 1944. They will be of the Mallet type, with 2-6-6-6 wheel arrangement, and will cost \$2,750,000, contract for their construction having been awarded to the Lima Locomotive Works, Lima, Ohio.

OPA Promises Price Raises

Maximum prices for bituminous coal will remain unchanged during the period of wage negotiations between the mine operators and the United Mine Workers, OPA announced June 10. But if a wage increase results from the negotiations, OPA stated, no retroactive price increase for bituminous coal will be authorized. Maximum prices, however, will be adjusted to eliminate hardship arising from any retroactive increase which conforms to stabilization standards. Adjustments would take the form of an increase in maximum prices which would spread the compensation for the retroactive labor cost over the remainder of the coal year until April 1, 1944.

Commission Gets Gas Case

With the completion of hearings and oral argument, the application of the Tennessee Gas & Transmission Co. for authority to construct a pipeline to supply the West Virginia-Ohio-Pennsylvania region with Louisiana and Texas natural gas went to the Federal Power Commission for decision on June 15. Intervenor in the case included the National Coal Association, the Anthracite Institute, various local coal operators' associations, the United Mine Workers and others. Those participating in the oral argument included N.C.A. and the Anthracite Institute. The pipeline is designed to deliver initially some 40,000,000 cu.ft. of natural gas per year into the area in question.

Stores Enjoined for Violation Of Price Regulations

Circuit Judge Minter Wilson has permanently enjoined six retail stores in northern West Virginia coal-mining communities from violating federal emergency price control regulations. A consent decree was entered in the case of Monongahela Stores, Inc., of Pursglove, while restraining injunctions requested by OPA were granted in cases involving the following: Pearsall Supply Co., Pursglove; Gill & Pellegrin, Edna; Lewis Pellegrin and Bunker Supply Co., Cassville; John Angiotti and J. A. Supply Co., Osego; and National Victory Supply Co., Maidsville.

Attorneys for the defendant declared the multiple regulations of the price control agency created a hardship to business men and denied there was willful intent to violate the regulations.

The injunctions were sought after the recent check of coal-mining communities uncovered the violations, Chief Attorney Bernard Sclove of the State OPA said.

Storage Campaign Continued: Anthracite Buying Limited

Efforts to promote the early buying and storage of coal continued on the radio and in the press in June, although the exhortations at times had a tendency toward a hollow sound in view of the antics of the United Mine Workers. In fact, the June 20 stoppage, not to mention the one on June 1, resulted in some loss of ground, although this was in part offset by a slight seasonal reduction in demand. Stoppages up to June 23, the Solid Fuels Administration estimated, resulted in a loss of 18,000,000 tons of bituminous production and 2,000,000 tons of anthracite.

As a result of the stoppages, freezing of coal in transit became an on-again off-again affair. Freeze orders were first invoked by Solid Fuels Administrator Ickes, the War Production Board and the Interstate Commerce Commission on May 1 and were suspended May 3. They were put into effect again on June 1, suspended on June 4, reinstated June 21 and suspended again June 23. As amended, the June freeze orders, in addition to barring railroad deliveries to consumers with more than a ten days' supply of coal, or who would have more if the coal was delivered, exempted the following: coal for export, including Canada; coal for water movement, frozen before reaching destination, however, if subject to transshipment by rail; coal for vessel use; coal for delivery to a connecting carrier; coal delivered to a consignee's siding for railroad convenience if still subject to diversion or reconsignment (unloading prohibited); transactions specifically authorized by the Solid Fuels Administrator or the I.C.C.; and coal loaded on railroad cars at mines which continue to operate or resume after date of the order. The orders are WPB M-316 and I.C.C. Service Orders Nos. 120 and 121.

Buying of anthracite was limited by Administrator Ickes June 21 in an effort to

insure equitable distribution during the summer months. Under the terms of the order, described as temporary, each community will be limited to the quantity of anthracite, in four sizes, that was delivered during the base period of April-August, 1942, or five-twelfths of the coal shipped from April, 1942, to March, 1943—whichever is larger. Administration will include setting up a national and six regional anthracite distributing committees. Sizes affected by the regulation are egg, stove, chestnut and pea.

Buckeye Coal Co. Men Receive Job Instructor Training

The tabulation of companies in western Pennsylvania receiving Job Instructor Training—Coal Age, June, p. 127—failed to include the Buckeye Coal Co. Further information received reveals that 58 foremen and supervisors from that company received such training.

WPB Priority System Explained

Operating and purchasing officials of 35 coal-producing companies met June 16 at the Fort Stanwix Hotel, Johnstown, Pa., to hear an explanation of the operation of the War Production Board's system of priorities for mining equipment and supplies. Dr. M. H. Stow, deputy director, Mining Division, WPB; J. L. G. Weysser, deputy chief, Coal Section, Mining Division, WPB, and Richard Lloyd, regional technical advisor, Mining Division, WPB, Pittsburgh, Pa., outlined the procedure and answered questions.

A similar meeting was held June 17 at Punxsutawney, Pa., at which representatives from the western part of the district were present. Both meetings were sponsored by the Central Pennsylvania Coal Producers' Association to assist producers in this field to handle a complex problem. B. W. Deringer, production manager, Central Pennsylvania Coal Producers' Association, acted as chairman at both meetings.

Obituary

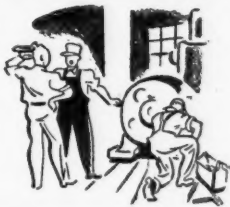
CHARLES EDWARD STUART, 61, president of the engineering firm of Stuart, James & Cooke, Inc., New York and Washington, D. C., died June 20 in Columbia-Presbyterian Medical Center, New York. He achieved international recognition for his work in reorganizing the Soviet Russian coal-mining industry. His company also was prominent in mining engineering in this country.

M. J. REID, general manager of the Pershing Fuel Co., Des Moines, Iowa, for the last ten years and member of District 12 Bituminous Coal Producers Board, died June 18.

WILLIAM ABRAM, president and owner of the Colfax Coal Co., Colfax, Iowa, and member of the District 12 Bituminous Coal Producers' Board, died June 19. He had been in the coal-mining industry in Iowa for the last 50 years.

What's Your #1 Headache?

1 UNEXPECTED BREAKDOWNS?



How many of your key machines were designed for 24-hour-day service? Good thing to know today!

2 LABOR SHORTAGE?



Does part of your process use men unnecessarily? Remember—mining is a machine industry!

3 LAGGING SCHEDULES?



Maybe you have a bottleneck machine—an added machine would load up other units.

4 OVERWORKED ENGINEERS?



Common today—but outside engineering cooperation may be all that's needed to get you out of a hole.

WHICHEVER IT IS—CALL ON ALLIS-CHALMERS!

HERE'S something for every coal operator to lean on these days — and lean on *hard*... Allis-Chalmers Cooperative Engineering!

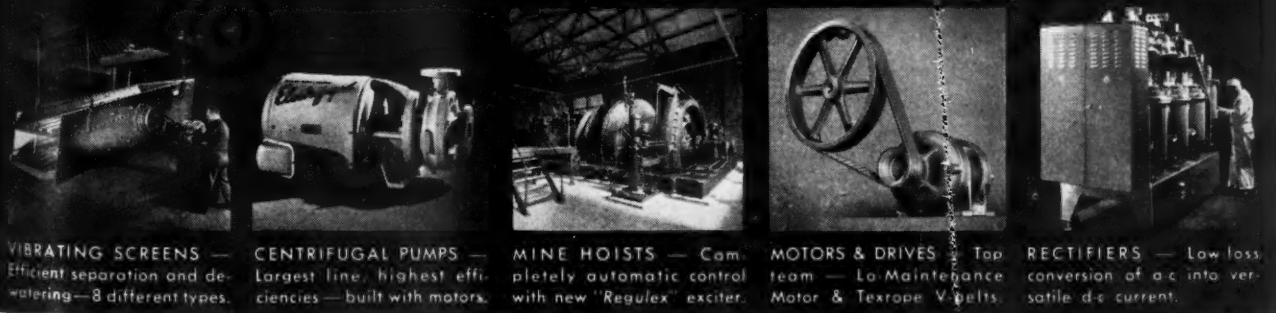
Making *all types* and *complete lines* of equipment, our engineers analyze your problem from the viewpoint of your *entire* production process. They know how vital it is for various machines to team-up properly — how to *achieve* teamwork!

Whether you have a big or a small problem, Allis-Chalmers Cooperative Engineering is yours for the asking. ALLIS-CHALMERS, MILWAUKEE.

A 1613-E



Only Allis-Chalmers Makes a Complete Line of this Equipment...



VIBRATING SCREENS — Efficient separation and dewatering—8 different types.

CENTRIFUGAL PUMPS — Largest line, highest efficiencies—built with motors.

MINE HOISTS — Completely automatic control with new "Regulex" exciter.

MOTORS & DRIVES — Top team — Lo-Maintenance Motor & Texrope V-belts.

RECTIFIERS — Low loss conversion of a.c. into versatile d.c. current.

New Wire Rope Simplification Plan Welcomed by Users

In this, the 16th of a series of informative articles on wire rope, the Macwhyte Wire Rope Company presents a condensed report of "Simplified Practice Recommendation R198-43." This sound and widely discussed plan was developed through the combined efforts of the National Bureau of Standards and engineers of the Wire Rope Industry. This timely information will be most useful to wire rope users.

* * *

For many years, both wire rope users and the wire rope industry have hoped for a reduction and simplification of the number of wire rope items. The wide variety of items was not only confusing to users, but also increased the problems of manufacturing and stocking so many different ropes.

Shortly after Pearl Harbor, it became obvious that both a steel and a manpower shortage would develop. Since reduction and simplification of wire ropes would help save steel, conserve time and manpower, and expedite deliveries, the Bureau of Standards worked out a

plan described in "Wire Rope Simplified Practice Recommendation R198-43." Copies may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, D. C. Price 10 cents. This plan is one which consumers, distributors and manufacturers have long wanted; not only as a wartime conservation measure, but as a basis for improved service afterwards.

What, briefly, is this simplification plan? How does it affect you?

The wire rope simplification program is concerned primarily with a reduction in the number of different sizes, varieties, and grades of wire rope produced for stock purposes.

Wire rope engineers working with the Bureau of Standards found that 20 wire rope constructions cover the vast majority of wire rope tonnage.

By adhering to these constructions, the number of ropes are reduced from 973 to 643, or 33.9%.

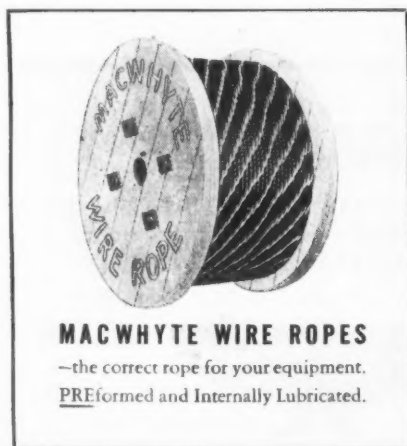
How Users Benefit

By reducing the number of "special" ropes, more attention can be paid to faster production of those ropes most widely used. Better service and delivery can be made to users as larger stocks will be available due to greater production of fewer items.

Your Cooperation

Hundreds of manufacturers, distributors, users, and all wire rope manufacturers have indicated in writing, their acceptance of this simplified wire rope practice which will result in increased efficiency for manufacturers, distributors and users... not only now but also in the post-war period.

Wire rope users can aid materially in the success of this program by voluntarily confining their specifications and orders, so far as possible, to the items recommended by the simplified practice program.



Pamphlet Explains All

Macwhyte has just published a pamphlet, "Wire Rope Simplification Practice No. 43-32," listing construction, weights, breaking strengths, and grades of ropes in accordance with simplified practice. If you care for a copy of this useful pamphlet, write your request on company letterhead and send it to Macwhyte Company.

NO. 681

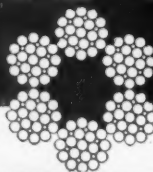
MACWHYTE COMPANY

WIRE

ROPE



2931 FOURTEENTH AVENUE

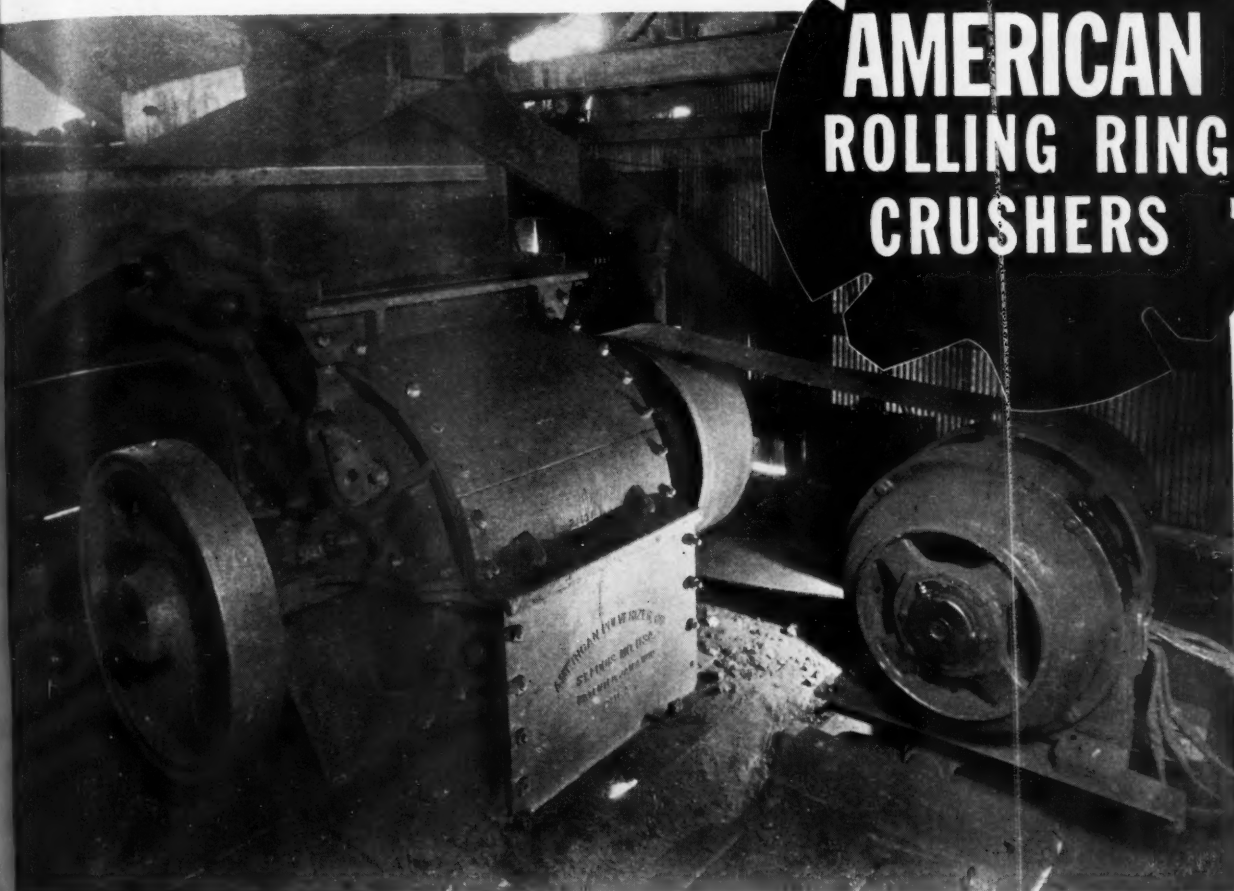


KENOSHA, WISCONSIN

Mill Depots: New York · Pittsburgh · Chicago · Fort Worth · Portland · Seattle · San Francisco. Distributors throughout the U.S.A.
Manufacturers of MACWHYTE PREformed and Internally Lubricated Wire Rope MONARCH WHYTE STRAND Wire Rope
MACWHYTE Special Traction Elevator Rope MACWHYTE ATLAS Braided Wire Rope Slings MACWHYTE Aircraft Cables and Tie-Rods

★American Rolling Ring Crusher, Type CC, in tipple of Chieftain No. 20 Mine, in Indiana.

AMERICAN ROLLING RING CRUSHERS



Serve for years with minimum replacement and maintenance costs

Built in a number of types and sizes, each American Rolling Ring Crusher Unit is available in an arrangement to meet the particular requirements of any application.

Coal is crushed at less than one cent per ton. You get greater range of reduction, uniformity of size, and extreme simplicity of operation.

Year after year American Rolling Ring Crushers installed in many of America's mines continue to do a full and dependable job. We will be glad to make recommendations for your specific purposes.



Why you get Splitting Action instead of Crushing

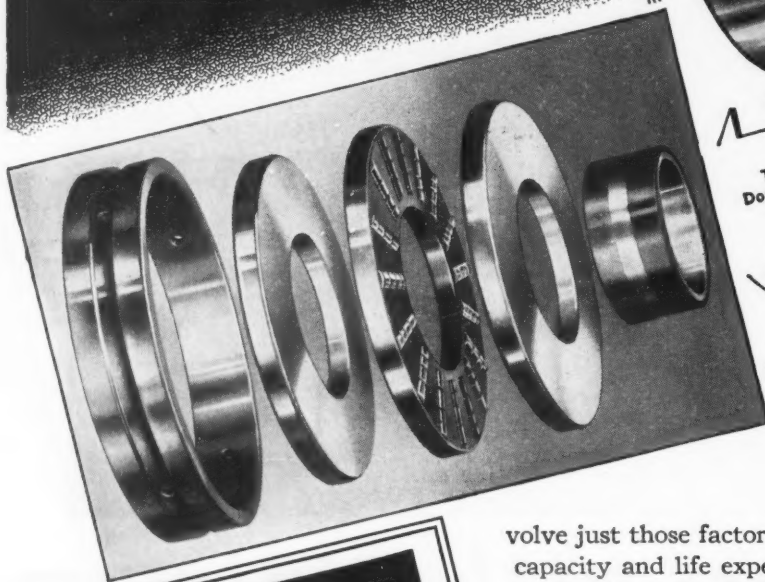
• Patented reversible manganese steel SHREDDER RINGS are found only in the American

Rolling Ring Crusher. The Rings have twenty cutting edges or teeth and are designed to maintain their outward position by centrifugal force at specific speeds. In contact with solid metal the rings are momentarily deflected from their usual course because they are free to swing back out of position. No shear pins or other safety devices that require attention.

AMERICAN PULVERIZER COMPANY 1119 MACKLIND AVENUE
ST. LOUIS, MISSOURI
ORIGINATORS AND MANUFACTURERS OF RING CRUSHERS AND PULVERIZERS

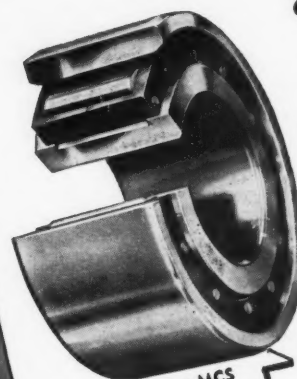
ROLLWAY'S

Right-Angle
BEARING LOADING
is the
RIGHT LOADING!



ROLLWAY

BUILDING HEAVY-DUTY BEARINGS SINCE 1908



Type MCS
Double Width
RADIAL

Type SDT
Double Acting
THRUST

Especially
FOR

1. higher bearing capacity in the same dimensional limits
2. oscillating or shock loads
3. heavy thrust loads
4. continuous operation without cool-off
5. longer bearing life under all loads

● The advantages of Rollway's right-angle bearing loading are so self-evident as to be axiomatic. They involve just those factors that are used in computing the carrying capacity and life expectancy of *every* bearing. In short, reduce the load per bearing if you want to lengthen the life, counteract shock and vibration, or provide freer running.

Rollway Splits Each Load Into Two Parts

Rollway *reduces the load carried per bearing* by the simple expedient of splitting each load into its two simplest components of pure radial and pure thrust. Each of these two components is carried by a separate bearing assembly, and always at right-angles to the roller axis. There are no compound loads, no oblique resultants, to complicate design and pile up stresses. And there is no wedging or pinching of rollers, therefore, markedly less rubbing friction and wear-back of the roller heads.

Standard Sizes for Most Applications

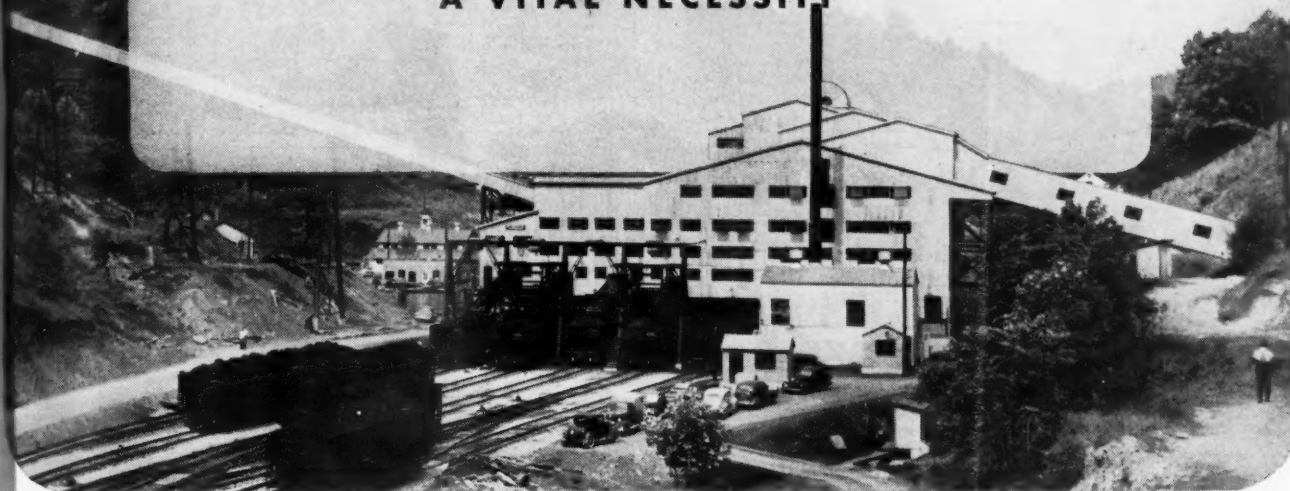
- S.A.E. or American Standard metric dimensions and tolerances in a wide range of sizes and types assure low cost and ready availability for most applications. Let our engineers recommend the types best suited to your needs. Send sketch, drawing, or detailed description for free confidential bearing analysis and recommendation. No obligation.

BEARING COMPANY, INC., SYRACUSE, NEW YORK

BEARINGS

FUTURE HORIZONS FOR COAL

MAKE CORRECT PREPARATION
A VITAL NECESSITY



Our national consumption of coal, because of widespread conversion from other forms of firing, has already reached heights never before equalled. And, inevitably, the growth of new uses for coal, in production of plastics, explosives, rubber, pharmaceutical chemicals, dyes, organic chemicals—even oil and gasoline, will increase demands to even greater proportions.

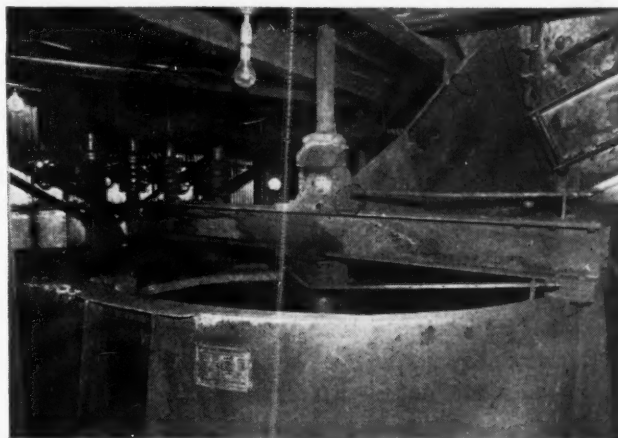
Consequently, Coal Preparation assumes even greater importance, both in the interests of speeded production and from a standpoint of quality requirements . . . for, logically, **scientifically prepared** coal, having minimum and uniform sulfur and ash content, will take first preference.

Therefore, consult FAIRMONT on your coal preparation problems **now**. FAIRMONT has a Preparation System to meet your specific cleaning requirements—Wet or Dry.

Consider the Chance Sand Flotation System . . . a high capacity, thoroughly dependable wet process of coal cleaning that has proved highly successful throughout the coal industry. Or,

if a dry method of cleaning is more applicable to your operations, look to the American Pneumatic Separator . . . an exceptionally efficient system which is also being used with great success.

Call in a FAIRMONT Engineer today . . . he'll advise on the method of preparation best suited for your coal . . . make recommendations to help you meet present and future requirements.

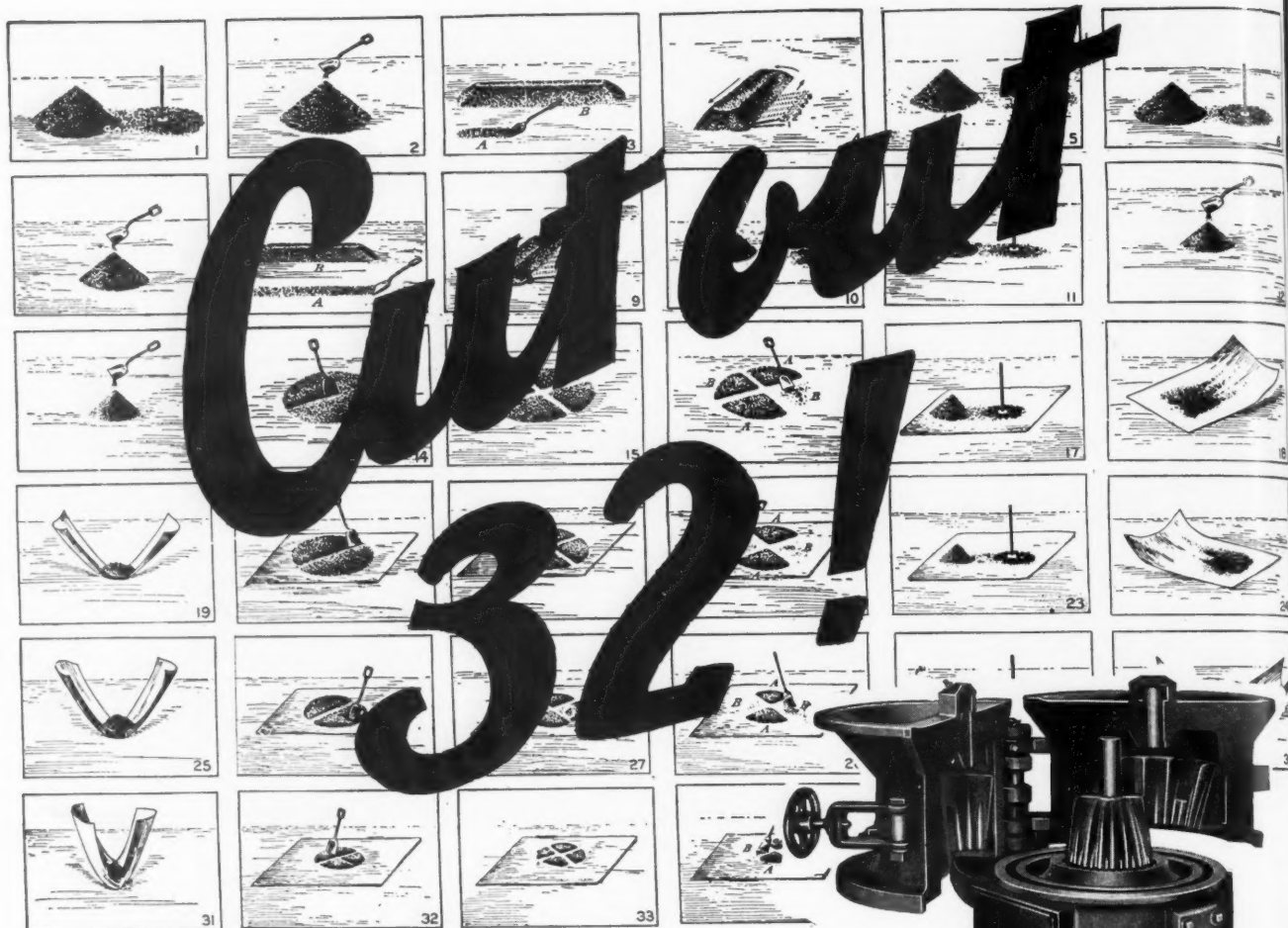


Installation view—Chance Sand Flotation System.

TRADE MARK REGISTERED

FAIRMONT MACHINERY COMPANY

FAIRMONT, W. VA.



**Eliminate 32 operations—
Do a day's work in minutes!**

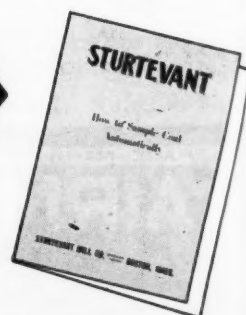
USE THE
Sturtevant **AUTOMATIC
COAL CRUSHER
AND SAMPLER**

You coal operators need no sales talk on today's vital importance of PROPERLY SAMPLED COAL to produce a properly blended and graded QUALITY product. Even with the manpower shortage you can get such samples—and save time, too. With the Improved Sturtevant Automatic equipment you can crush and sample 1000 lbs. in a FEW MINUTES, eliminating all inaccuracy due to the human element, and getting a far superior product for shipment to the Laboratory.

Interested? Then write for Bulletin 85—"How to Sample Coal Automatically". Contains complete details, sectional views, and actual comments from Engineers as to results. Send for your copy TODAY.



- GREATER ACCURACY!
- MORE SPEED!
- NO MOISTURE LOSS!
- INCREASED SALES!



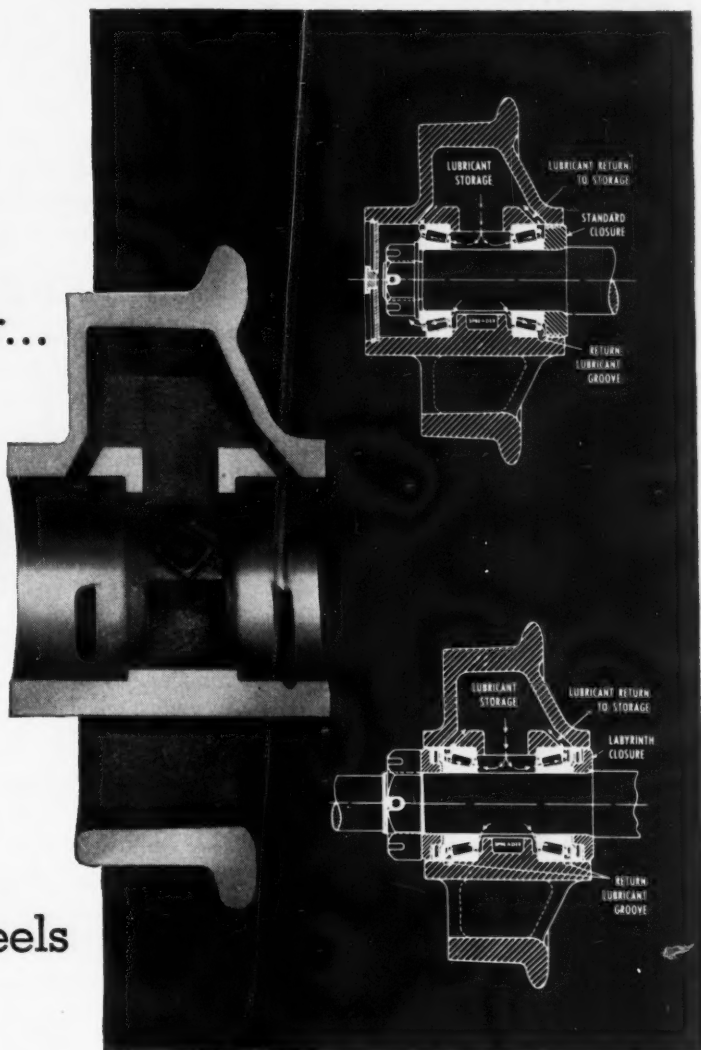
STURTEVANT MILL CO. HARRISON SQUARE BOSTON, MASS.

They stay in service longer...

they **lubricate**
themselves...



Hockensmith "Oilspok" Wheels



"Oilspok" Wheels last longer because they reduce excessive tread wear, caused by churning resistance of heavy greases. "Oilspok" Wheels rotate freely . . . and one greasing lasts *several* years. Lubrication is constant and positive . . . and there is no loss of oil due to bearing pumping pressure or air expansion.

Each hollow spoke of "Oilspok" Wheels has three ports leading into the hub—one large central port and two narrow rectangular ports,

situated at the outside of each bearing. The diamond-shaped spreader, cast integrally with the hub, forces the excess lubricant clinging to the axle into the bearing, from which it is thrown by centrifugal force back again to the storage spokes or reservoirs. "Oilspok" Wheels are made for plain or roller bearings.

Make sure you get the best in mine car wheels. Get "Oilspok" Wheels and save money. Write for full information.

CONSTRUCTION FEATURES

CORRECT DESIGN. Hockensmith "Oilspok" wheels are designed with correct proportioning of the tread, hub, and spokes for maximum strength with an ample margin of safety.

CAREFUL METALLURGY. Cast from a special alloy to insure deep chilling, strength, and toughness.

SKILLED MOULDING. Cast in machined chills, producing a round wheel and smooth tread—little brake skidding or rolling friction on the rail.

CONTROLLED ANNEALING. Internal strains are eliminated by carefully controlled annealing in soaking pits located in the foundry floors so wheels reach them immediately after the iron has solidified.

PRECISION MACHINING. Specially designed machines insure tread being concentric with the bore, and hubs being machined to exact limits—important steps in the manufacture of a good wheel.

Hockensmith
Wheel & Mine Car Company

Established 1877

PENN, PA.

Long Distance Phone, Jeannette 700

OIL IS AMMUNITION, USE IT WISELY

This is 1943

A year so different for all of us. A change in living, in habits, in lifelong customs. Ration coupons; not dollars, now buy the gasoline, steaks, shoes. Industry and manufacturing have their alphabetical program to follow. It's a far cry from our former methods to the way business is conducted in 1943.

INDUSTRIAL RUBBER PRODUCTS

The Rubber Industry has been forced to make many changes. Its achievements have been marvelous and ranks high with the progress made by any Industry. Since the call came, unbelievable quantities of Belting, Hose, and Packings have been made and supplied to Uncle Sam, a production feat unequalled by any other Industry.

QUAKER

is playing an important part to
GOVERNMENT • WAR PLANTS • INDUSTRY

Quaker has been right in step with changing conditions. Quaker is supplying large quantities of Belting, Hose, Packings and miscellaneous Moulded items to the Government and plants on

war work. But, Quaker has been able to keep some Industrial Rubber Goods moving to those having an essential need for these critical products. It is our purpose to continue to do so.

Buy More War Bonds and Stamps

QUAKER RUBBER CORPORATION

PHILADELPHIA • NEW YORK • CHICAGO • HOUSTON

Western Territory

QUAKER PACIFIC RUBBER COMPANY • San Francisco • Los Angeles



REG. U.S. PAT. OFF.

FAITH and COURAGE Must be Maintained

Some day . . . may it be soon . . . the conditions of today will change for the better. While they continue, all must keep faith; looking forward to the best, while preparing for the worst and having courage to take what comes until final VICTORY DAY is ours.

QUAKER

is looking to the future with confidence. Industrial Rubber Products are essential to our way of life. When peace time comes, Quaker will quickly adjust production to fill the vast needs of a civilian demand.

MAY THAT DAY BE SOON

Simplex Ball Bearing Anchor Jacks Are Time-Savers!

They pin down shaker conveyor drives so that they "stay put". Can be set up faster than timbers and wedge blocks. The Ratchet Adjustment insures quick and tight positioning of the Jack. Use them as fulcrum posts for anchoring swivel and right angle troughs. For use with 3" pipe on small or medium drives and 3 1/2" pipe on heavy duty drives. Corrugated mine roof end; toggle, ball or pointed hold-down end. Screw extends 12".

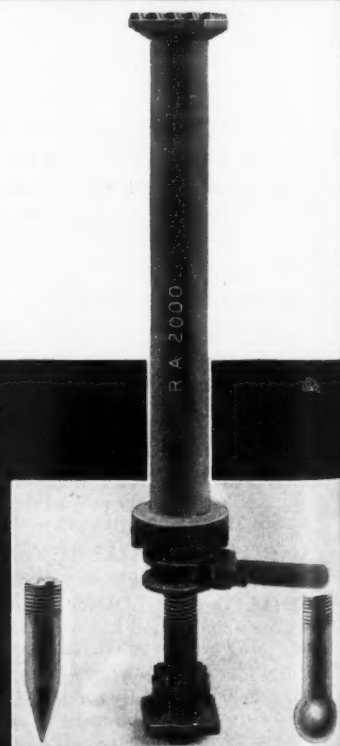
Templeton, Kenly & Co.

Better, Safer Mine Jacks Since 1899

Chicago, (44) Ill. California, Pa. Princeton, W. Va.

Get Out More Coal!

Simplex Jacks prevent accidents, thereby increasing man-hours. There's a Simplex for every mining requirement. Ask for Bulletin, "Mines-42".



Simplex
LEVER • SCREW • HYDRAULIC
Jacks

1943-1944 WILL BE A LONG COLD WINTER

Avoid costly shut-downs that seriously hamper production. Thoroughly check and examine all of your equipment now to be sure it is ready for a long hard winter, or better yet, send for a Holmes Engineer to give your plant a complete check-up. He will be glad to give you recommendations based on years of practical experience.

In going over your plant use this list, checking items needing repairs or replacements

CONVEYORS

- SPROCKETS
- CHAINS
- FLIGHTS
- PANS
- BEARINGS
- SHAFTING

HOISTS

- DRUMS
- SHAFTING
- SPIDERS
- MOTORS
- ENGINE PARTS
- CABLES

RETARDERS

- DRUMS
- SHAFTING
- BEARINGS
- CABLES

ELEVATORS

- SPROCKETS
- CHAINS
- BUCKETS
- CASING
- BEARINGS
- SHAFTING

SHAKERS

- SCREENS
- HANGERS
- BEARINGS
- SHAFTING
- ECCENTRICS
- DRIVES

GAGES

- BAIL
- PLATFORM

SHEAVE WHEELS

- SHAFTS
- BEARINGS

ROBT. HOLMES AND BROS., INC.

DANVILLE, ILLINOIS



How can we end strikes?

Management ~~X~~ plus Labor

Wartime strikes are different from strikes in times of peace.

While most workers probably feel a sense of shame in participating in them, the fact remains that strikes are taking place.

Viewed in the abstract wartime strikes are symptoms of a basic misunderstanding of industry on the part of government.

McGraw-Hill, through newspaper advertisements, is trying to create an understanding of the changes that are necessary in present government policies in order to help keep industry functioning continuously and smoothly. The advertisement reprinted here is the latest of a series which appears every two weeks.

More and more manufacturers are recognizing the need of educating the people in their own communities, as well as their own employees, on the relationship of sound industrial progress to good living. Many companies are distributing booklet reprints of these "Seed Money" messages and are quoting them regularly in their own bulletins, house organs and newspaper advertisements.

We will gladly supply a newspaper mat of this advertisement—in full page size—to manufacturers who wish to run it, over their own signatures, in their local newspapers.

James H. McGraw, Jr.
President

McGraw-Hill Publishing Company, Inc.

IT is unnatural for people with sons and brothers at the front to strike.

It's easy to hurl dirty words at them when they do halt war work, but maybe we'll get further if we dig down below the accusations and find out what really is the matter.

Generally strikes result from mis-managed human nature. Sometimes Labor Leaders do the mis-managing, sometimes Management itself is to blame.

► But, in wartime, both Management and Labor Leaders are having the grim experience of watching Government try its hand at managing human nature . . . So far, Government isn't doing so good.

There are many causes of strikes, but we believe the way to stop strikes that are aimed at breaking through wage ceilings is to encourage every man to feel that he is "in business for himself."

The best way to make a man feel that way is to see that he gets an automatic reward for every improvement in his work.

Today, fair and workable plans for tying wages to performance instead of artificial ceilings have been developed. They are being used successfully in many industries.

Such plans should be pushed more vigorously by Government and Labor, as well as Management.

Government is having trouble with human nature on other fronts, too.

Most of this trouble traces back to the fact that Government wants more and more production on one hand, while on the other it discourages the individual enterprise that creates production.

Much of the public resistance to sound and necessary Government acts stems from fear that regimentation and bureaucratic control of our lives is the real goal of Government.

FREE MATS: If you would like to publish this message over your own company name, or distribute it in handy booklet form, write or wire: Research Dept., McGraw-Hill Publishing Co., Inc., 330 West 42nd St., New York (18), N.Y.

How can we end strikes? (cont'd)

The real objective of Government should be to release the immense powers of *individual* effort.

After all, Government's need is simple. It wants **MORE WORK DONE IN LESS TIME.**

Getting more work done in less time is Industry's dish.

Doesn't it make sense, therefore, for Government to devote every effort to making it easy for Industry to do its job?

If government people want to know how industry has gotten more work done in less time, the answer is easy. Here it is:

1. Constantly improve the equipment available for workers.
2. Use the lowered costs thus produced to
 - (a) lower prices to consumers.
 - (b) raise wages in proportion to increased efficiency.
 - (c) provide incentives for invention, investment and individual enterprise.
 - (d) lay aside "Seed Money" that can be used to start over again at item 1.

Constantly Improved Equipment

► Few people ever think of "constantly improved equipment" as a helpful answer to war production, manpower shortages, raw materials shortages, food shortages and post-war jobs.

Yet constant improvement in machines and methods is our only chance for doing more work in less time.

Lower Costs Produce Lower Prices

In these days of price ceilings, we think so much of higher prices that we forget how easy it will be to lower prices when we can get better machines.

Wages in Ratio to Efficiency

With all the talk of wage freezing, we also forget that the true American system is to raise wages *without increasing prices*, through better machines and methods. Strikes for higher wages disappear when incentive wages are properly used.

Incentives for Invention, Investment and Development

► Of all the things that helped make America great, this is the one that has taken the most kicking around.

Excessive taxes on business profits, salary freezing and hundreds of other political limitations discourage the old "take a chance" spirit that built up our country.

Lower Costs Provide "Seed Money"

► Another thing you hear a lot of talk about in Washington is "Post-War Planning."

In Washington, that means public works and government spending.

In Industry, it means developing and buying new machines to produce new products to sell at lower prices to attract enough new buyers to make 20,000,000 new jobs.

The Washington plan means more taxes.

The Industrial way will pay for itself.

But Industry will need billions of dollars to convert its machines and factories back to peace work. That will cost as much as war conversion, or more.

That's why Industry needs to save its "Seed Money" now.

The only way industry can get more "Seed Money" is through a complete change of government attitudes toward industry. We hope government people will soon see that when tax laws decrease the saving of "Seed Money" (money earmarked for plowing back into a business) they strike at industry's only means of developing this country after the war.

What You Can Do About It

If you agree with this advertisement, then write to your congressman and tell him you believe in the Incentive System that has built up our country—that means Incentive for labor, as well as for invention, investment and management. Ask him to review each proposed law and regulation with this fact in mind:

**"Industrial Progress
is the Source of all Good Living."**

THE MCGRAW-HILL NETWORK OF INDUSTRIAL COMMUNICATION

22 publications, which gather "war-news" from the "war-production-front" through a staff of 153 editors and 725 engineer-correspondents . . . More than 1,500,000 executives, designers, production men and distributors use the editorial and advertising pages of these magazines to exchange ideas on war-production problems.

MCGRAW-HILL BOOKS

Publishers of technical, engineering and business books for colleges, schools, and for business and industrial use.

This advertisement is available in handy booklet form. (Less than 100 copies free. Larger quantities, \$1.50 per 100; \$10.00 per 1000.)

McGRAW-HILL

PUBLISHING COMPANY, INC. . . . BOOK COMPANY, INC.

330 WEST 42ND STREET, NEW YORK (18), N. Y.

THE MCGRAW-HILL NETWORK OF INDUSTRIAL COMMUNICATION:

American Machinist • Aviation • Bus Transportation • Business Week • Coal Age • Chemical & Metallurgical Engineering • Construction Methods • Electrical Contracting • Electrical Merchandising • Electrical West • Electrical World • Electronics • Engineering & Mining Journal • E. & M. J. Metal and Mineral Markets • Engineering News-Record • Factory Management & Maintenance • Food Industries • Mill Supplies • Power • Product Engineering • Textile World • Wholesaler's • Business Publishers International Corporation, an affiliate, publishers of Business and Technical Magazines for Latin America, and Overseas Circulation.

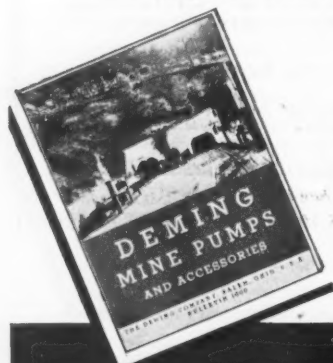
ON GUARD
against
MINE WATER

★ ★

In wartime, mine water is doubly dangerous. Always a threat to mine operations, mine water is now a potential "enemy agent"—a menace to our war against the Axis.

Deming Mine Pumps are engineered to fight off mine water. Dependable performance makes Deming Pumps vital allies of mine operators.

Put Deming Pumps on guard in YOUR mines. *They will PROVE their dependability!*



THE DEMING CO.
SALEM, OHIO

Send for special Bulletin 1000 which contains important data on the complete line of Deming Mine Pumps and Accessories.

DEMING
Mine Pumps

HENDRICK
Carbondale 1600
for
PERFORATED PLATE
Round—Square—Diagonal—Slot
Any perforation
HENDRICK MANUFACTURING CO.
41 DUNDAFF ST., CARBONDALE, PA.
Sales Offices in Principal Cities.
Please Consult Telephone Directory.

FLEXIPIPE
The improved flexible tubing for
mine and tunnel ventilation
This flexible air tubing is ready for immediate, easy installation. With our NEW ROPE SEAM SUSPENSION it can be put up or taken down in a fractional part of the time required by other means of face ventilation.
Write for free sample and full information.
BEMIS BRO. BAG CO.
ST. LOUIS, MO.

Mathematics made plain —and easy to learn—and amusing

THAT is the purpose, completely realized, of this new mathematics text. The authors begin (with a humorous story) right on the edge of the Unknown where arithmetic can no longer show the way. After a thorough course in algebra they take you on a survey of the highlights of trigonometry, analytic geometry, more advanced algebra, and calculus, with a seasoning touch of the theory of numbers. The style is light, the explanations are detailed and the book makes highly interesting reading.

LIVING MATHEMATICS

By R. S. Underwood and Fred W. Sparks, Texas Technological College. 365 pages, 6 x 9, \$3.00

HERE is just the book for: Those who have met with initial failure in trying to master the intricacies of the subject; and now, as adults, can be expected to make real headway when the subject is presented as a fascinating pastime.

Those who 'took to it' readily when first presented; and now wish to pick up the threads and go on to higher mathematics,—the calculus and number theory.

In this book you will find drama, zest, humor, surprise, challenge and human interest.

10 DAYS TRIAL—SEND THIS COUPON

McGraw-Hill Book Co., 330 W. 42nd St., N. Y. C.
Send me Underwood and Sparks' Living Mathematics for 10 days' examination and approval. In 10 days I will send \$3.00, plus few cents postage, or return book post paid. (Postage paid on cash orders.)

Name
Address
City and State.....
Position
Company P.C. 10

The greatest help a coal mining man can have—

IF YOU want to make sure of getting your certificate of competency—sure of winning a bigger job with bigger pay, get Beard's great books today and put them to work for you.

In these three books you have a practical, always-on-the-job guide that will help you solve the problems you face every day, show you what to do, tell you why it should be done.

Beard's Mine Examination Questions and Answers!

3 volumes — \$7.50, payable in four monthly payments

THESE books explain what a man must know in order to become a mine inspector, a mine foreman, assistant foreman, fireboss, hoisting engineer, safety engineer, shot-firer, etc.

They give you complete and authoritative information about air and gases, explosives, safety requirements and methods, mechanics, engines, hoisting, drainage, pumping, ventilation, timbering, instruments, and every other detail that the practical mining man must know.

Can you answer these questions—

What is meant by splitting the air current and what are the advantages derived from such methods?

Can a miner live in air in which the oxygen content is reduced to 17 per cent?

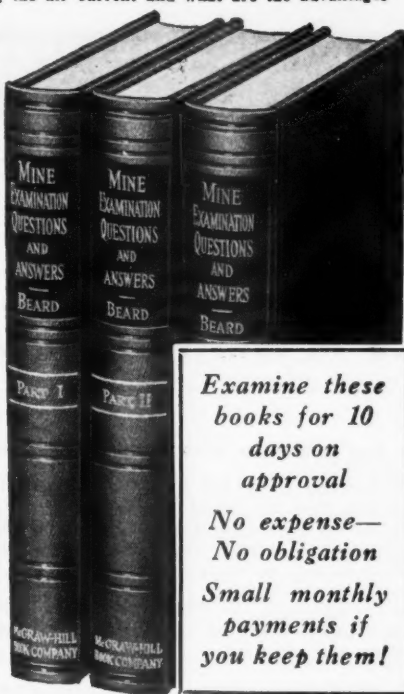
Name five duties imposed on mine foremen by law.

In what time can an engine of 40 effective hp. pump 4,000 cu. ft. of water from a shaft 360 feet deep?

What are the advantages and disadvantages of a gasoline pump, an air pump and an electrical pump?

What is the estimated tonnage per acre, per foot of thickness, for bituminous coal?

These are but a few of the more than 2000 questions given in Beard's books together with full correct answers. Hundreds of men have used this method to prepare for higher, better jobs. You can too, if you have the Beard books and plan to use them systematically. They are the best investment that a mining man can make—not only as an aid for passing examinations but as practical reference volumes on everyday mining operation problems.



Examine these
books for 10
days on
approval

No expense—
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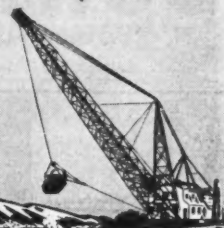
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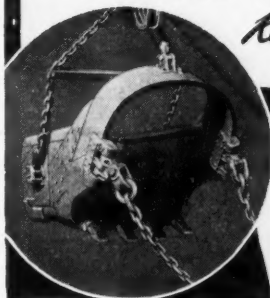


GOOD MAINTENANCE IS ESSENTIAL TO PRODUCTION

- 1. CHAINS.** Chain life is shortened by uneven wear. Turn them over periodically.
- 2. TEETH.** Sharp teeth are vital to fast digging. Renew points frequently.
- 3. "PICK-UP."** Dragging the bucket after loading wastes time and causes excessive wear.
- 4. CONTROL.** Help your operator prevent damage to bucket from uncontrolled dropping and jerking by keeping machine in adjustment.

Boost Production...

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Automatic
DRAGLINE BUCKETS

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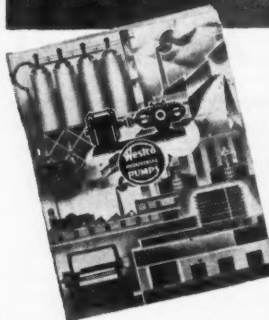
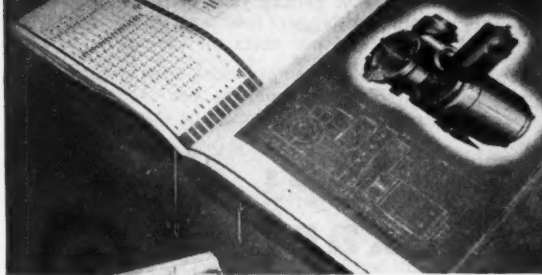
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LIFE -**

**DON'T
FORGET!**

to - CHECK OIL IN GEAR CASES EACH WEEK

Oil should be changed when it shows signs of thinning and the body of the oil starts to break down. Do not permit the oil to get too low that the gears will not pick up and distribute it. Keep vents in filler cap open to avoid the case leaking.

CHECK ENGINE LUBRICATING OIL TWICE EACH SHIFT

Oil should be checked after machine is stopped and oil has drained back into oil pan. Add oil if necessary. Oil filters should be drained and filters serviced at intervals prescribed by engine builders. (Engines without filters should be drained every 50 hours). Oil screen in crank case of engine should be examined every month and cleaned if necessary.

LUBRICATE CRAWLERS AFTER EACH SHIFT

Grease crawler tread rollers every eight hours regardless of distance traveled or every half mile if they are in continuous operation. Keep crawler treads properly adjusted—never work machine with a loose crawler belt.

SEE THAT OIL OR GREASE REACHES EVERY PART THAT REQUIRES LUBRICATION

When a shaft, gear or clutch is in such position that greasing or oiling is impossible, operator should take time to turn machinery over so that every part may be properly lubricated. Oil lines to inner bearings should be inspected often, as vibrations sometimes loosen line connections. *Lima Locomotive Works, Incorporated, Shovel and Crane Division, Lima, Ohio.*

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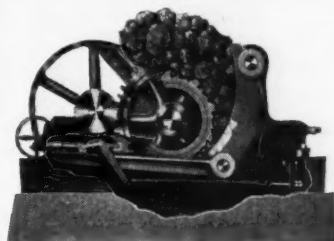
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twenty years experience as a mine official and mechanical mining, first grade mine foreman's certificate Penna. Superintendent at present will make change. PW-215, Coal Age, 330 W. 42nd St., New York, N. Y.

MINING ENGINEER, age 44, with 22 years experience in engineering, supervision and underground mechanization. References and interview, if desired. Location immaterial. PW-223, Coal Age, 529 N. Michigan Ave., Chicago, Ill.

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BOOKS—Out-of-print. U. S. Geological Survey, Bureau of Mines. Lists available by states. James Howgate, Bookseller, 120 So. Church St., Schenectady, N. Y.

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15—6-ton General Electric, equipped with CY-21 floating type motor driven gathering reels, all equipped with HM-801F, 250 volt ball bearing motors, 42" gauge, B-62 controllers, steel strip resistance. Just taken out of service—Excellent condition.

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Several 8, 10 and 13-ton Jeffrey, Goodman and Westinghouse Locomotives. 36" to 44" gauge.

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2—312-AA Goodman Low Vein, 250 volt. Like new.
6—35-B Jeffrey, 250 volt.
6—CE-7 Sullivan, 220 volt AC.

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400—3-ton, 44" gauge, end dump mine cars, 16" Timken Roller Bearing Wheels. Just taken out of service—in excellent condition.

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1—800 H.P. Allis-Chalmers, single drum slope hoist, 7000' of 1 1/4" rope, 30,000# rope pull, rope speed 870 FPM, 2300 volt.
1—500 H.P. double drum, 1600' of 1 1/4" rope, 2300 volt, Ward-Leonard Control.

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1—1300 H.P. Vulcan Hoist, double cylindro-conical, 900' of 1 1/4" rope, 2300 volt motor.
Complete specifications on request.

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1—200 KW Westinghouse Motor Generator Set, 900 RPM, 250 volt DC, 2300 volt AC, complete with necessary switchboards and switchgear.

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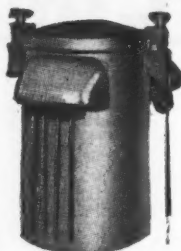
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Steel Plate Storage Bins That Can Be Reassembled—Order At Once.
58 Bins in Various Capacities and Sizes

Cu. Ft.	Dimensions
35,184	18'4"x70'x27'5" high
19,592	11'3"x40'6"x43' high
10,440	12'x58'x15' high
9,270	12'x51'6"x15' high
7,460	10'x55'3"x13'6" high
6,827	12'8"x44'x12'3" high

Also Various Bins as follows:

4—1,650 cu. ft. and under
4—1,116 cu. ft. and under
5— 896 cu. ft. and under
6— 640 cu. ft. and under
7— 532 cu. ft. and under
12— 370 cu. ft. and under
11— 288 cu. ft. and under
2— 95 cu. ft. and under
1— 37 cu. ft.

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Thousands of feet of bucket elevators, all sizes of buckets, mostly all steel encased

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Using 844 chain, 103 chain, 132 chain and SS40 chain.
New Buckets and Gears

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6"-7 1/2"-8"-10"-12"-14"-16"-18"-and 20" In Steel Box—Over 10,000 ft. all lengths.

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ABRASIVE RESISTANT COVERS

Width	Ply	Top-Bottom	Covers	Width	Ply	Top-Bottom	Covers
48"	8	1/8"	1/16"	20"	5	1/8"	1/32"
42"	5	1/8"	1/16"	20"	4	1/8"	1/32"
36"	6	1/8"	1/16"	18"	4	1/8"	1/32"
30"	6	1/8"	1/16"	16"	4	1/8"	1/32"
30"	5	1/8"	1/16"	14"	4	1/16"	1/32"
24"	5	1/8"	1/32"	12"	4	1/16"	1/32"
24"	4	1/8"	1/32"				

Inquire For Prices - Mention Size and Lengths

TRANSMISSION BELTING

HEAVY-DUTY FRICTION SURFACE

Width Ply	Width Ply	Width Ply
18" - 6	10" - 6	6" - 5
16" - 6	10" - 5	5" - 5
14" - 6	8" - 6	4" - 5
12" - 6	8" - 5	4" - 4
12" - 5	6" - 6	3" - 4

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"A" WIDTH All Sizes | "D" WIDTH All Sizes
"B" WIDTH All Sizes | "E" WIDTH All Sizes
"C" WIDTH All Sizes | Sold in Matched Sets
Inquire For Prices - Mention Size and Lengths

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FIRE HOSE

**APPROVED SPECIFICATION HOSE
EACH LENGTH WITH COUPLINGS ATTACHED**

Size	Length	Per Length
2 1/2"	50 feet	\$28.00
	25 "	16.00
2"	50 "	23.00
	25 "	13.00
1 1/2"	50 "	20.00
	25 "	11.00

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**SPECIAL OFFER... HEAVY DUTY
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1"	25 "	8.00
1 1/4"	25 "	6.25
	25 "	12.00
	35 "	7.50
	40 "	10.50
1 1/2"	50 "	12.00
	25 "	15.00
	35 "	10.00
	50 "	14.00
		20.00

AIR HOSE		
I.D. Size	Length	per Length
1/2"	25 feet	\$5.00 - \$1.50 Pair
3/4"	50 "	10.00 - 1.50 "
	25 "	6.25 - 2.50 "
1"	50 "	12.50 - 2.50 "
	25 "	10.00 - 3.50 "
	50 "	20.00 - 3.50 "

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**6 YD. or 8 YD.
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225B Bucyrus 80 ft. Boom, 54 ft.
Dipper Stick, Steam Shovel.

2-4 Yds. SHOVELS

2 Marion Model, 125, Electric, 35' Boom,
25' Dipper Sticks

DIESEL DRAGLINE

3W 4W & 5W Monigham Walkers, 90
to 110 ft. booms.

3 Yd. P.&H. 800, 97' boom.

2 1/2 Yd. 48B Bucyrus 80' boom.

2-2 1/2 Marion Electric Shovels.

75-1 1/2 & 2 Yd. Dump Cars.

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(7) Steam 80 ft., 300 ft., 600, 1000 & 1940 ft.
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(14) Gasoline, 110, 160, 220, 310 & 370 ft.

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Jeffrey Single Roll 18x18, 24x24 & 30x30
Link Belt 26x24 Double Roll Crusher

HYDRAULIC CARWHEEL PRESSES:

100 Ton, 150 Ton, 300 Ton, 300 & 400 Ton Cald-
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1000' 60", 600' 30", 300' 20", 180' 42", 900' 48",
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Idlers, Heads & Tail Pulleys, Steel Frames, Trip-
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100 KW Ridgway 1200 RPM 3/60/2300-250-275
150 KW G.E. 1200 RPM 3/60/2200-250-275
200 KW Ridgway 900 RPM 3/60/2200-250-275
3-100 KW G.E. 275 v. 1200 RPM Rotaries

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2 1/2 ton Witcomb 24 ga. New Batteries
2-4 ton G.E. 30 in. ga.
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4-5 ton G.E. 36 in. ga.
3-7 ton Goodman 36 ga. Battery & Trolley
8-6 ton Baldwin Westgh. 42 ga. & 36 ga.

TROLLEY LOCOMOTIVES:

2 1/2 ton Westinghouse 24 ga.
4-6 ton & 3-5 ton Goodman, 36 ga.
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4-6 ton Goodman 42 ga.
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2-8 ton Goodman 36 ga.
10 ton Goodman 42 ga. & 13 ton Jeffrey

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9 Tyler Hummer 3x6, 4x5, 4x8 & 4x10
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60-Western 16-20-30 yd. Side Dump

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3 W 90' Boom, 6 & 160' Boom, Model 6150, 175'
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2 yd. Link Belt Elec. Shovel & Dragline
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Junior Joy 36 ga. Low Pan
Conway 20 Mucker
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7 Conway 20A, 30A, 50A, 60 & 75 Muckers

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5x100' Traylor Rotary Dryer
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Clamshell Buckets 3/4, 1, 1 1/2 & 2 yd. Cap.
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1-8-Ton Westinghouse, 250 volt, 42" gage
1-6-Ton Westinghouse, 250 volt, 44" gage
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1-6-Ton Irontron, 250 volt, 44" gage, low vein

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1-100-KW Ridgway M-G set, 275 volt
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1-24 x 24 Jeffrey coal crusher
2-Cameron Centrifugal pumps, 650 G.P.M.
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1-American 41 ton, 4 wheel, saddle tank, Loco-
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cylinders 9 x 14, ASME boiler.

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1-Jeffrey 24 x 24 single roll coal Crusher, New
condition.

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1-36" x 740 ft., roller bearing idlers, complete with
electric motor and belt in new condition.

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Prompt Shipment From Our Warehouse

MINING MACHINES

- 1-12 G3 Goodman 220/3/60 AC 6' Bar.
 3-12 AB Goodman 250 V. DC 6' Bar.
 1-35 B. Jeffrey 250 V. 6' Bar Bowdill #11416, with cables.
 212 G3 Goodman AC Low Vein 6' bar

STORAGE BATTERY LOCOMOTIVES

- 4 General Electric 6 Ton Permissible Type LSBE Class 2C6 Form C 9 with 2 HM 825 Ball Bearing Motors. 1 1/2" armorplate frame. 44" Ga. (Can change to 36" ga. or less.) Each locomotive equipped with an Exide Ironclad Battery 54 cell 23 plate with 12 months of original guarantee also 1 Charging Panel with each locomotive. 13 1/2" long, 50" high, 69" wide and 44" Wheel Base. Available for inspection at our Oakdale Shop.
 5 1/2 Ton Ironclad Type E. 42" Ga. with Gould Battery 23 plate with 12 months of original guarantee.
 5 Ton Ironclad locomotive, Type E2, 36" Ga. with Gould Battery 23 plate with 12 months of original guarantee.
 5 Ton Mancha 36" Ga. Low Type.
 4 Ton Jeffrey 44" Ga. with Battery.

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- 2-4' x 5' single deck Tyler Hammer Screens Type 37 equipped with V-16 Vibrators No. 2860 and 2867 designed for 110 v. AC 15 cy.

(Haulage)

- 10 Ton Westgh. 250 V. 36" or 40" Ga.
 8 Ton Westgh. 250 V. 42" Ga.
 2-5 Ton West. 250 V. 36 or 42" Ga./with Electric Gathering Reels. Bar steel frame.

MG SETS 3 ph. 60 cy. (Syn.)

- 150 KW Ridgway 250 V. DC 2200 V. AC 900 RPM.
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 65 KW G.E. 250 V. DC-2200 V. AC 1200 RPM.
 30 KW West. 250 V. DC-220 V. AC 1150 RPM.
 22 1/2 KW Al. Ch. 125 V. DC-2200 V. AC 900 RPM.

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- 1-500 KW HCB Gen'l Elec. 275 v. with switchboards and Trans. 6600 or 3800 v. 3 ph. 60 cy.

ENGINE GENERATOR SETS

- 100 KW 250 v. DC Westgh.—Skinner Engine.
 50 KW West. 125 v. DC—Skinner Engine.
 25 KW Westinghouse 125 v. Steam Turbine.

SYN. MOTORS 3 ph. 60. cy.

HP	Make	V.	Speed
75 (1)	G.E.	2200	900

SLIP RING & SQ. CG MOTORS (3 ph. 60 cy.)

HP	Make	Speed	Wdg.	Type
700	G.E.	393	S.R.	MT 432
400	West.	500	S.C.	Cs.
300	G.E.	600	S.R.	IM
200	G.E.	250	S.R.	MT 412
150	G.E.	720	S.R.	IM
150	West.	580	S.C.	OCL
150	G.E.	600	S.R.	IM
125	Al. Ch.	435	S.R.	
100	G.E.	500	S.R.	MI-25 cy.

HIGH TORQUE WOUND ROTOR MOTORS

(Wound Rotors)

HP	Make	V	Speed
200 (4)	G.E.	2200	610
150 (3)	G.E.	2200	610

HOISTS

- 75 HP Lidgerwood sgl. fr. drum
 50 HP Diamond 2 drums same Shaft
 52 HP American 2 drum AC Motor.
 30 HP Clyde sgl. drum AC Motor
 30 HP Double drum—Tandem
 15 HP Lidgerwood sgl. dr. AC Motor

400 TRANSFORMERS (Westgh. & GE 1 ph.)

Qu.	KVA	Pri. V.	Sec. V.
3	1	2080/2200	115/250
5	2	"	"
100	5	"	"
82	7 1/2	"	"
71	10	"	"
1	25	2200	244/488
1	30	2080/2200	115/230
3	37 Rotary	4400/185	"
3	50	22000	2200
3	75	2200	110/220
1	100	2300	230/460
1	100 Uptegraft	400	220
1	150	3 Phase	230/460

D. C. MOTORS

- 200 HP Allis Chalmers 230 V. 600 RPM.
 125 HP General Electric 230 V. 750 RPM.

MOORHEAD-REITMEYER CO., INC.

PITTSBURGH, PENNSYLVANIA

COAL CUTTING MACHINES

- 3-35B Jeffrey 250 V Shortwalls.
 2-35B Jeffrey 500 V Shortwalls.
 1-35BB Jeffrey 250 V Permissible Shortwall.
 1-35BB Jeffrey 500 V Permissible Shortwall.
 1-29LE Jeffrey T.O.H. Arcwall 250 V Permissible.
 1-12AB Goodman 250 V Shortwall.
 2-12A Goodman 500 V Shortwalls.
 1-112EJ Goodman Permissible Shortwall 250 V.
 1-12G3 Goodman AC Shortwall 3/60/220/440 V.

LOCOMOTIVES

- 1-13 ton G.E. with HM-829 250 V Motors.
 1-10 ton G.E. with HM-830 250 V Motors.
 2-6 ton Jeffrey with MH-88 250 V Motors.
 1-6 ton G.E. with HM-819 250 V Motors.
 2-5 ton G.E. with MH-825 Motors and reels.

ELECTRIC MOTORS

- 1-100HP Crocker-Wheeler Syn. Motor, 3/60/240 V 1200 RPM.
 1-165 HP G. E. Syn. Motor 3/60/2200 or 500 V 900 RPM.
 1-100 KW Westinghouse Type 180 SK 275 V 900 RPM, DC Generator.
 1-100 HP Westinghouse Type CW Slip Ring Motor, 3/60/2200 V 720 RPM.
 1-185 HP Burke Squirrel Cage Motor, 3/60/2200 V 1150 RPM.
 1-25 HP West. Type HK, 250 V Series Wound Hoist Motor, 600 RPM.
 1-15 HP West. Type HK, 230 V Series Wound Motor.
 1-90L Goodman Elevating Conveyor.

Tippins Machinery Company

3530 Forbes St. Pittsburgh, Pa.

MINING MACHINES

Goodman Standard & Universal.
 AC & DC Rebuilt & Guaranteed

MINE LOCOMOTIVES

5 to 20 ton.

STRIPPING SHOVELS

M. G. SETS & ROTARY CONVERTERS

PUMPS and FANS

COAL CRUSHERS

Coal hopper with weigh pan and scale
 Hydraulic Wheel Presses

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 9,500' 90 lb. ASCE
 9,000' 90 lb. ARA-B
 Also 70s—58 1/2s—56 lb. Rails with Splice Bars and Tie Plates

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STEAM ENG. GENERATOR Sets 250 V. DC 15-35 & 50 KW

TIES 3000-4' Treated

CRUSHER Jeffrey—Single Roll 18 x 18

MINE CARS 800-24" Ga. 12" Wheel

HOISTING ENG.—2nd Motion

HEAD FRAME For Air Shaft—Steel

SHIEVE SHEEL—6' New

MOTOR Crocker-Wheeler 250 V. DC 1150 RPM—60 HP

HAULAGE MOTORS—3-7 1/2 Ton Goodman Single Armature
 1-7 1/2 Ironclad Combination

CUTTING MACHINES—4—Standard Sullivan

BOILERS—2-72" x 22" with Stack & Breeching

ELECTRIC HOIST—G.E. 150 HP. Drum 5' to 7' Complete

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M.G. Sets

2-300 KW 600 Volt Synchronous Motor Generator Sets 2200 Volt AC.

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RELAYING RAILS—Super-quality machine-reconditioned—not ordinary Relayers.
 NEW RAILS, Angle and Splice Bars, Bolts, Nuts, Spikes, Frogs, Switches, Tie Plates, and all other Track Accessories.

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RAILS—CARS

All sections of rails and good serviceable second hand cars, all gauges, also spikes, bolts, frogs, switches and ties.

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AIR COMPRESSORS—DIESELS—PUMPS

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Near Toledo

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Cincinnati Machinery & Supply Co.
 217 E. Second St. Cincinnati, O.

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LOCOMOTIVES

1 1/2 to 16 Ton—18" to 56" Track Gauge

GREENSBURG MACHINE CO.

Greensburg, Penna.

REBUILT EQUIPMENT—READY TO SHIP

MINING MACHINES—250 V. DC

- 1—CE-9 Sullivan
- 1—12AA Goodman 36" ga.
- 1—Goodman Slabbing 42" ga.

MINE LOCOMOTIVES

- 1—6 ton Atlas 36" ga. AC or DC
- 10 ton Milwaukee GASOLINE

ROTARY CONVERTERS

- 1—500 kw. G.E., type HC-8. 600 volt, 900 rpm, complete with transformers and switchboards
- 200 kw. G.E. 275 v. DC 900 rpm complete with transformers

M. G. SETS—SYNCHRONOUS

- 1—150 KW Ridgway 275 v. 900 rpm. 2300 v. 3 ph. 60 cy.

HOISTS

- 100 HP. Lidgerwood 2 drum AC or DC Motor

ROCK DRILLS

- 1—Ft. Wayne—2 1/4 HP 230/500 v. DC Motor

TRACK DRILLS

- 2—Moore Track Drills #1

PICKING TABLE

- 1—Jeffrey Apron Conveyor 5 HP DC Motor

SCALES

- 6—Fair. Morse #11 1/2 3 beams (2—200# ea. 1—50 lbs.) platform 16 1/2 x 21 1/2

TRANSFORMERS—1 PH. 60 CY.

- 25—5 KVA 220 v. 122/244 G.E.
- 30—7 1/2 KVA 2200 v. 122/244 G.E.
- 50—10 KVA 2200 v. 122/244 West.
- 3—15 KVA 2200 v. 122/244 G.E.
- 3—37 KVA 4400 v. 185 v. Rotary Transformer
- 4—60 KVA 6600 v. 550 v. Allis Chal.
- 3—100 KVA 6600 v. 220/440/550 v. Pgh.
- 3—150 KVA 2300 v. 6900 v. Pgh.
- 1—150 KVA 2080 v. 230/460 G.E. 3 ph.
- 1—250 KVA 2300 v. 460 v. G.E. 3 ph.
- 3—1500 KVA 22000 v. 6600 v. Allis Chal.

CENTRIFUGAL PUMPS

- 2—1000 GPM Cameron bronze 100' hd. 8x8
- 1—800 GPM Weinman 90' hd. 6 x 5
- 1—750 GPPF DeLaval 70' hd. 6 x 6
- 1—Worthington 5 x 5 single stage mtd. on truck 15 HP motor

DIESEL ENGINE SET

- 1—217 KVA G.E. 2300/220/440 v. 3 ph. 60 cy. rpm. dir. con. to 260 HP Buckeye horiz. 2 cyl. Diesel

A. C. SQUIRREL CAGE MOTORS

H.P.	Volts	Make	Type	R.P.M.
250	550	G.E.	I-K	720
250	220/440	G.E.	KT	1200
225	2200/220/440	G.E.	Syn.	200
200	220	G.E.	I-K	600
200	2200	West.	CS	870
200	2200	G.E.	KT	1800
150	220	G.E.	I-K	450
150	550	G.E.	I-K	514
150	220/440	L. Allis	FX	1750
100	220/440	G.E.		1750

230 V. DC MOTORS

H.P.	Make	Type	R.P.M.
25	Triumph	1750	
25	Westg.	1700	S
25	Western Elec.	730	ELC
30	Westg.	1150	SK-110L
30	G.E.	1100	ELC
35	Westg.	950	S
35	Westg.	875	SK-140
40	G.E.	1700	RC-31
40	Westg.	935	S
50	G.E.	1700	DLC-202
50	Westg.	1700	S-8L
53	G.E.	1050	RC-33
55	Westg.	825	S
60	Westg.	875	SK-150
60	West.	850	
125	Morg. Gardner	425	CCD
150	Cr. Wheeler	625	
200	Westg.	400/800	
300	Westg.	140	

D.C. GENERATORS—250 V.

Qva.	H.P.	Make	R.P.M.
1	17 1/2	Duquesne	1450
1	20	Westg.	1500
1	30	Westg.	1150
1	35	Westg.	800
1	40	Westg.	1150
1	50	G.E.	1200
1	50	Westg.	1050
1	60	Westg.	1050
1	100	G.E.	720
1	100	Westg.	500
1	100	Morgan Gardner	570
1	110	Cr. Wheeler	720
1	200	Westg.	505
1	250	Westg.	175
1	700	Westg.	450
1	750	Westg.	110

DUQUESNE ELECTRIC & MFG. CO. . . . PITTSBURGH, PA.

CURRENT SPECIALS

Two—Ironton type WOD double motored 42" ga combination battery-trolley locomotives (without batteries). GE 80 volt ball bearing motors, worm & worm gear drive, ball bearing trucks. Good used condition. Extra trucks. Price, subject inspection and prior sale, \$1250.00 each.

Two—Mansha single motored 36" ga battery locomotives (without batteries). As is, subject inspection and prior sale, \$600.00 each.

One—Westinghouse six ton 42" ga trolley locomotive, Serial 47870, bar steel frame, two type 904, 250 volt, motors, MB 24A controller, extra trucks. Good used condition. Price, subject inspection and prior sale, \$2650.00.

One—100 KW Allis-Chalmers rotary converter, with three 40 KVA transformers, HV 6900, LV 185-92.5. As is, subject inspection and prior sale, \$1350.00.

Two—562 KW Allis-Chalmers turbo-generators, 3 phase 60 cycle 2300 volt, complete with condensers, piping, valves, wiring and switchboards. Price, \$10,000.00 per unit, subject inspection and prior sale.

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Steam Driven Air Compressors
Large Steam Pumps
Guaranteed Used Pipe
Steel Buildings
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IRON and STEEL PIPE

New and Used
Large Stocks, all sizes
attractive prices

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ROTARY CONVERTERS

- 500 KW AL-CH SYN. 275 V. 6 Ph., 60 Cy., 1200 RPM. Pedestal Type, 2300/4000 V. Transformers.
- 500 KW WEST. SYN. 275 V. 6 Ph., 60 Cy., 1200 RPM. Pedestal type, 2300/4000 V. Transformers.
- 300 KW G.E. SYN. 275 V. HCC. 6 Ph., 60 Cy., 1200 RPM. form P. 2300/4000 V. Transformers.
- 200 KW AL-CH SYN. 275 V. 6 Ph., 60 Cy., 1200 RPM. Pedestal type, 2300/4000 V. Transformers.
- 150 KW G.E. SYN. 275 V. HCC. 6 Ph., 60 Cy., 1200 RPM. form P. 2300/4000 V. Transformers.

MOTOR GENERATORS

- 500 KW G.E. SYN. 600 V., 2300/4000 V., 3 Ph., 60 Cy., 1200 RPM. Manual Switchgear.
- 200 KW G.E. IND. 600 V., 2300/4000 V., 3 Ph., 60 Cy., 1200 RPM. Manual Switchgear.
- 200 KW R.W. SYN., 275 V. 2300/4000 V., 3 Ph., 60 Cy., 900 RPM. 80% P.F. Manual Switchgear.


LOCOMOTIVES

- 13-T WESTGHE, 250 V., 908-C Mts., 36"-44" Ga.
- 10-T WESTGHE, 250 V., 907-C Mts., 36"-44" Ga.
- 10-T WESTGHE, 500 V., 907-C Mts., 36"-44" Ga.
- 8-T JEFFREY, 250 V., MH-100 Mts., 36"-42" Ga.
- 8-T JEFFREY, 250 V., MH-85 Mts., 24"-36" Ga.
- 8-T WESTGHE, 250 V., 906-C Mts., 36"-44" Ga.
- 8-T WESTGHE, 500 V., 906-C Mts., 36"-44" Ga.
- 8-T GOODMAN, 250 V., 132-A Mts., 36"-44" Ga.
- 6-T WESTGHE, 250 V., 904-C Mts., 36"-44" Ga.
- 4-T WESTGHE, 250 V., 902-C Mts., 36" Ga.


Each unit listed above is owned by us and is available now for immediate purchase.

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Incorporated
501 Grant Building Pittsburgh, Pa.



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MOTORS
TRANSFORMERS
MOTOR GEN. SETS
OIL SWITCHES
AIR CIRCUIT BREAKERS



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Immediate Delivery

Large Amount of
Genuine JOY 5 BU
Loading Machine
Parts

5—Sullivan CE 7

Short Wall Machines

220 Volt a.c. 42" Gauge

Bargain, "As Is"!

2—G.E. 6-ton Locomotives
250 volt, 42" Gauge

Bargain "As Is"!

Mining Machinery

Sales Corp.

1214 Fisher Bldg.

Chicago, Ill.



LOCOMOTIVES

Goodman: All 250 volts.

- 1—10 ton, 31-1-4-T.
- 1—6 ton, 30B, 48" 1—5 ton.
- 1—5 ton, W-1-2, 36".
- 1—4 ton, 8-30.

Westinghouse: All 250 volt.

- 1—4 ton, 902, 48" 1—18 ton, 102, 42"
- 1—904 c. 44" 500 volt. Also 906 motors.
- 1—10 ton, 915.

G.E.: All 250 volt.

- 4 ton 1022, 41, as is
- 6 ton 803, 44", as is 5 ton 825, 44"
- 6 ton 823, 44" 8 ton 839 motors
- 6 ton 801

Jeffrey: 6 ton, and 4 ton, all gauges, 250 volt

- 2—Jeffrey MH 110 Locomotives
- 1—Jeffrey MH 100

AERIAL TRAMWAYS * HOISTS * PUMPS * MOTORS * TRANSFORMERS * BOND WELDERS * RESISTANCE * COMPRESSORS * DUMPS * SPEED REDUCERS
FIELD FRAMES * ARMATURES * GOODMAN HYDRAULIC SHOVELS * MOTOR STARTERS AND CONTROLLERS—AC & DC * DROP BAR SUPPORTS (Goose-
neck), 29B and 29C * MINING MACHINE TRUCKS * SWITCHBOARDS * CIRCUIT BREAKERS—AC & DC * CONVEYOR HOISTS * COAL CRUSHERS (double
roll) 12"x16", single roll 24"x36" 30"x30" 24"x24" and 18"x16" * Diamond BIT SHARPENER * TURBO-GENERATOR 500 K.W. 275 volt DC * ROPE & BUTTON
CONVEYOR 400' long LATHES, SHAPERS * LINK BELT * ELECTRIC SLATE DUMP * SWITCHES * AUTOMATIC CIRCUIT BREAKERS 250 volt 600 amperes
to 2000 amps * MANUAL CIRCUIT BREAKERS 600 amps to 3000 amps * HOISTS, overhead, AC, 3-60-440, 1 ton and 2 ton * CAR RETARDERS, Fairmont
85# and 100#. STEAM POWER PLANT, 2 Boilers, 2 turbo-generators, 2300 volt, 1 Clam shell bucket 1 1/2 cubic yard, 1—Figure 8 drum. Coal Crushers—18x16
—24x24—36x36. MINE CARS Solid. 22" high with rotary dump.

GUYAN MACHINERY COMPANY, Logan, W. Va.

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Like New Machinery

- 1—Sturtevant Co. No. 5 form M exhaustor direct connected to 20 H.P. 3450 R.P.M. motor
- 1—Stephens-Adams vertical 48" belt and bucket elevator with steel housing
- 1—Stephens-Adams 30" belt tripper with 2 way discharge chute
- 1—Robins 24" Belt Tripper with 2 way chute
- 1—Mashek 36" steam jacketed horizontal mixer
- 1—Mashek 30" non-steam jacketed horizontal mixer
- 1—Mashek Briquetting Press complete with rolls; capacity 25 tons per hour
- 2—Modern direct connected Gas Scrubbers, 12 ft. diameter x 38 ft. high, complete with pine grids
- 1—Steel tank 32' x 32' on steel structural legs with 200 lineal foot conveyor gallery
- 1—Double hopper steel bin on steel structural legs, capacity 180 tons with 66" vertical double chain bucket elevator and steel housing
- 6—Wellman Co. No. 5 double bell fuel feeders for gas producers
- 1—Deming triplex pump fig. 50, 5 1/2" by 8" capacity 160 G.P.M. at 75' head.
- 1—Kennedy 125 lbs., 24" Flg. Gate Valve with 6" By-pass valve cast integral with main valve
- Several Kennedy 18", 20", 50 lb. pressure O S & Y rising stem gate valve
- 1—Westinghouse two speed motor 7 1/2 to 20 H.P., 430 to 870 R.P.M.
- 1—New Bristol model 311 M three pen recording thermometer with 2—45' and 1—25' leads, range 0 to 450 centigrade

IMMEDIATE DELIVERY

PRESTFUEL CORPORATION

3650 East 112th Street Chicago, Illinois
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MINING EQUIPMENT

- 1—200 KW, G.E. Rotary Converter
- 3—55 KVA, 2300/4000Y—173 volts, Rotary Converter Transformers
- 3—165 KVA, 6600—445 volts, Rotary Converter Transformers
- 1—Ingersoll-Rand Portable Mine Type Air Compressor with drive AC & DC Motors up to 50 H.P.
- 3—Oxide Film Lightning Arrestors
- 5—Ampere Recalibrated Watthour Meters
- Rebuilt Distribution Transformers

R. H. Benney Equipment Company

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FOR SALE

100 Steel Mine Cars, 36" gauge. Overall Length 6'4". Overall width 42". Height from top of rail 24". Wheel diameter 12". Equipped with Hyatt roller bearings.

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480 Lexington Ave., New York, N. Y.

MINING MACHINES

Jeffrey, 35B, 29B, and 4—28A, 250 V. 2—29C with drop bar support.

Goodman, 12A, 12AB, 12AA, 12G3A, 34B.

1—12G3 250 volt and 2—112 DA, 500 volt.

2—Permissible Type 12CA. 6—112AA.

1—124AA.

Sullivan, CE7, CE9, CE10, CR10 Low Vein.

SUBSTATIONS—275 volts, D. C.

2—200 KW GE Rotaries (600 volt)

1—200 KW Ridgeway M.G. Set.

1—200 KW G.E. Rotary Converter.

1—200 KW West. Rotary.

1—150 KW West. Rotary.

1—200 KW, 1—100 K Ridgeway M-G Sets.

1—150 KW Ridgeway Rotary.

1—150 KW West. Rotary converter.

1—100 KW West. M-G Sets.

1—90 KW G.E. Rotary.

FOR SALE

Used—Mine Hoists—Locomotives—Muck Cars—Pumps

Allis Chalmers Hoist, 30,000 lb. 870 F.P.M., Single Drum, 7,000' 1 1/4" rope capacity, with two 400 H.P. Electric Motors.

Ottumwa Hoist, 6,500 lb. 450 F.P.M., Single Drum, 100 H.P. Electric Motor.

LOCOMOTIVES—36" Ga. 4, 8 and 15 ton. Trolley and combination types.

MUCK CARS—36 Ga. 4 to 12 yd. capacity.

PUMPS—Deep Well, Vertical and Horizontal Centrifugal.

Complete description and prices upon request. No Priority Required.

LAWRENCE PIPE COMPANY

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FOR SALE

BOILERS, ENGINES, AND MINING EQUIPMENT

- 2—150 KW Ridgeway Steam Engine Generator Sets, direct connected.
- 1—200 KW Steam Engine Generator Set, direct connected.
- 1—Double Horizontal Danville Hoisting Engine, 6' drum, 125# steam pressure.
- 2—Ohio Standard Boilers 150 HP size 72" x 18' 125# steam pressure.
- 1—3 track wood tippie, 1800 ton capacity, equipped with feeder, shaker, 2 picking tables with booms and other conveyors with necessary DC motors to operate.

The George M. Jones Company
Glouster, Ohio

13—MODEL 47, Horizontal, 150 h.p. each FAIRBANKS MORSE Diesel Engines.

1—7 x 8 WORTHINGTON vertical, Triplex Power Pump. Reconditioned pipe—valves—fittings, 2" to 20".

Industrial Supply & Equipment Co.

CANAL BUILDING

New Orleans, La.

450 COMPOSITE MINE CARS

Cap. 6000#, 30" Track Ga., Lgth. 9'4", Width 52", Ht. overall 42"

IRON & STEEL PRODUCTS, INC.

13484 S. Brainerd Ave., Chicago, Illinois
"Anything containing IRON or STEEL"

HOIST

1—Ottumwa double drum, single gear reduction Electric Shaft Hoist, complete in first-class condition, with 60 horsepower, 600 revolution, 220 volt, 3 phase, 60 cycle, General Electric motor.

LESLIE E. BRYANT

Clarksville, Arkansas

FOR SALE

Steel Tippie. Three track Roberts and Schaffer steel tippie with marcus shaker screen and loading boom, 150 to 200 ton capacity. Also, one standard model Goodman 12AB, 35 Horse power, 250 volt cutting machine completely rebuilt with spare armature.

Write FS-218, Coal Age

330 W. 42nd St., New York City

FOR SALE

P. & H. Model 800 Diesel Dragline—moves on tractors—80-foot boom—3-yard bucket. Now located southern Indiana.

FS-221, Coal Age

520 North Michigan Ave., Chicago, Ill.

All of the above equipment in first class operating condition

FS-200, Coal Age

520 No. Michigan Ave., Chicago, Ill.

AC-DC MOTORS and STARTERS

DIRECT CURRENT MOTORS

230 VOLTS

CONSTANT SPEED

Q	HP	Make	Type	RPM
1	450	All. Chal.	Int.	415
1	150	Wsglse.	SK	1750
1	150	All. Chal.	SK	500
1	125	Gen. Elec.	DLC	550
1	110	Wsglse.	S	1050
1	100	Reliance	1050T	500
2	100	All. Chal.		1000
1	100	All. Chal.		335
1	75	Wsglse.	SK	1750
1	60	Gen. Elec.	RC	575
1	60	Wsglse.	SK	1750
1	50	Gen. Elec.	RC	700
1	50	Wsglse.	SK160	565
1	50	Wsglse.	SK143	850
1	50	Gen. Elec.	RC36A	650
1	40	Gen. Elec.	DLC202	1050
2	40	Wsglse.	S8	935
2	40	Gen. Elec.	RC15A	700
1	30	Gen. Elec.	RC	1150
1	30	Wsglse.	SK	975
1	30	Wsglse.	SK140	600
2	30	Wsglse.	S16	1650
1	30	Al. Chal.		950
10	25	Gen. Elec.	RC31	1150
4	25	Wsglse.	SK120	850
1	20	Reliance	131T	850
1	20	Wsglse.	SK	850
1	15	Gen. Elec.	RC	1150
2	15	Wsglse.	SK90	850
2	15	Wsglse.	SK	675
5	15	Gen. Elec.	RC11	850

CONSTANT SPEED CONT'D

Q	HP	Make	Type	RPM
1	15	Al. Chal.	ES0	1750
1	10	Wsglse.	SK	1325
1	10	Cr. Whlr.	CM	625
3	10	Wsglse.	SK80	750
4	10	Gen. Elec.	RC9	1150
12	10	Gen. Elec.	RC29	850
1	7 1/2	Eek Dynamo	7-12E	1150
1	7 1/2	Gen. Elec.	CD	1150
7	7 1/2	Cr. Whlr.	CCM	850
		Totally Enclosed		
1	7 1/2	Wsglse.	SK60	850
7	7 1/2	Gen. Elec.	RC9	850
10	5	Wsglse.	SK40	850
5	3	Wsglse.	SK33	850
		Sealed Sleeve Bearing		
1	3	Wsglse.	SK	1150
7	3	Cr. Whlr.	CCM	1150
1	2	Cr. Whlr.	CCM	1150
3	2	Wsglse.	SK23	850

230 VOLT VARIABLE SPEED

Q	HP	Make	Type	RPM
3	150	Diehl	K15	400/800
1	110	Wsglse.	S13L	650/1050
1	100	Wsglse.	SK	250/350
2	50	Wsglse.	S10	750/955
2	40	Gen. Elec.	LC	650/1300
3	25/100	Gen. Elec.	MPC	300/600
1	35	Gen. Elec.	DLC	600/1800
1	35	Gen. Elec.	LC	650/1300
1	30	Wsglse.	SK	600/1200
3	30	Wsglse.	SK	600/1000
3	30	Wsglse.	SK140	600/1200
1	25	Wsglse.	SK	400/1200
1	25	Wsglse.	SK120	825/1650
7	25	Reliance	131T	800/1600
1	25	Reliance	155TL	500/1500

VARIABLE SPEED CON'T

Q	HP	Make	Type	RPM
1	16-17 1/2	Wsglse.	SK110L	600/1200
3	15	Wsglse.	SK	500/1500
1	15	Wsglse.	SA9	300/1200
1	15	Gen. Elec.	RF10	550/1650
1	5	Wsglse.	SK103	400/1600
10	3	Roth Bros.	RS105	500/1000
		Ball Bearing, Totally Enclosed		
5	2 1/2	Wsglse.	SKS3	500/1000
		Sealed Sleeve Bearing, Tot. Encl.		
1	2	Wsglse.	SK23	700/2100

SLIP RING

Q	HP	Make	Type	RPM
2	150	Al. Chal.		600
1	150	Wsglse.	HF	495
1	50	Wsglse.	CW758	720
1	30	Gen. Elec.	ITC	900
1	25	Gen. Elec.	IM	900
1	15	Gen. Elec.	IM	900

Synchronous Motors and Alternators

Q	HP	Make	Type	RPM
1	268	Gen. Elec.	2300 v	600
1	125	Wsglse.	2400 v	900
1	100	Al. Chal.	2300 v	1200
1	100	Kw. Gen. Elec.	2300 v	900
1	100	Kva. Westinghouse	2300 v	900
1	75	Gen. Elec.	220 v	900

With Direct Connected Exciter

A C MOTORS

220-440 volts, 60 cycle, 3 phase

SQUIRREL CAGE

Q	HP	Make	Type	RPM
1	125	Cr. Wh.	125Q	900
1	50	Gen. Elec.	1K	600
1	50	Wagner	22VRM	600
		Ball Bearing		
1	40	Gen. Elec.	KT336	900
1	40	Reliance	19VRM	720
5	30	Wagner	19VRM	720
2	20	Gen. Elec.	KT312	1150
2	20	Reliance	120AA	900
1	20	U. S.	Crline	720
		Ball Bearing		
1	20	Reliance	178AA	720
2	15	Century	SCN19	1150
		Ball Bearing		
3	15	Reliance	404SI	900
		Ball Bearing		
1	15	Wagner	15VRP	900
2	10	Al. Chal.		1150
1	10	Lincoln		900
4	3	Imperial	F224	3600

GENERATORS

230 volt, D C

250 Kw. Westinghouse, 450 Rpm (2)
 200 Kw. Westinghouse, 500 Rpm (2)
 115 Kw. General Electric, 525 Rpm
 100 Kw. General Electric, MPL 600 Rpm
 (2)
 45 Kw. Diehl Compound Interpole, 550 Rpm
 40 Kw. Cr. Wheeler, CCD, 1085 Rpm

STARTERS

Over 500 A C and D C
Starters in stock

HEAT and POWER Company, Inc.

45 BOND STREET

Phone: ALgonquin 4-3874

NEW YORK, N. Y.

Power and Electric Railway Equipment For Quick Sale

ROTARY

CONVERTERS

25 cycle

General Electric and Westinghouse 1500 and 1000 K.W., 25 cycle, direct current Rotary Converters.

60 cycle

General Electric and Westinghouse 1000, 750, 500 and 300 K.W., 60 cycle, direct current, Rotary Converters.

Full Switching for All These Converters

LOCOMOTIVES

3-50 Ton

General Electric locomotives, 600 volt direct current. Excellent Condition.

TRANSFORMERS—MOTORS—GENERATORS

G. T. ABEL & CO., INC.

393 SEVENTH AV.,
NEW YORK, (1), N. Y.

EQUITABLE BLDG.,
OPP. PENN. STATION

MINE HOISTS

- 1—Ottumwa 18" Band friction will coil 2000 ft. 3/4" rope 35 or 50 HP motor.
 - 1—Vulcan 30" Band friction will coil 3000 3/4" rope 50 or 60 HP motor.
 - 1—Lidgerwood 36" friction drum will coil 2000 ft. 7/8", 100 HP motor.
 - 1—Connellsville 54" Band friction will coil 5000 ft. 7/8" rope 100 or 150 HP motor.
 - 1—Flory-Keyed drum 58' dia. with 100 or 150 HP motor.
 - 1—Lidgerwood 60" Band friction will coil 6500 ft. 1 1/8" rope with 200 to 350 HP motor.
 - 1—Vulcan 72" Band friction will coil 2000 ft. 1 1/8" rope with 250 HP motor
 - 1—Vulcan 60" Sliding pinion will coil 3500 ft. 1 1/8" rope. 200 HP motor.
 - 1—Lidgerwood-Cylindro Conical Shaft Hoist—225 ft. 1 1/4" rope. 300 HP motor.
 - 1—Vulcan-Cylindro Conical Shaft Hoist 350' 1 3/8" rope. 400 HP motor.
 - 1—Connellsville-Cylindro Conical Shaft Hoist 350' 1 1/2" rope. 800 HP motor.
- And other hoists to suit all mining conditions

Jones Mining Equipment Co.
541 Wood Street Pittsburgh, Pa.

NEW "SEARCHLIGHT" ADVERTISEMENTS

received by July 28th appear in the August issue, subject to space limitations.

Address copy to the
Departmental Staff

COAL AGE

330 West 42nd St., New York City

An asterisk preceding manufacturer's name indicates detailed information may be found in the 1942 *COAL MINING CATALOGS*.
Where † appears after a company's name the advertisement does not appear in this issue, but was in preceding issues.

[illegible]

Wyckoff Wood Pipe has an 88 year record of perfect resistance to the corrosive action of sulphurous mine water. It is an ideal, long-time investment—light, easy to lay, and relatively low in first cost.

We also manufacture a special Hard Maple Pipe for flushing culm in the Anthracite Region and wood covering for underground steam lines.

Established
1855



A. WYCKOFF & SON CO.

Office and Factory
No. 35 Home Street, Elmira, N. Y.
The Originators of Machine Made Wood Pipe

18,000 WORKERS WIPED OUT!
BY INDUSTRIAL ACCIDENTS

HELP PREVENT MANY ACCIDENTS WITH
AMERICAN CABLE TRU-LAY *Preformed* WIRE ROPE

You would be horrified at newspaper headlines which said the enemy had wiped out an entire division of the U. S. Army! Yet, in 12 months after Pearl Harbor, an entire division of industrial workers were killed by accidents—*many of them needlessly*.

Many operators have drastically reduced time-out accidents (and compensation claims) by adopting American Cable **TRU-LAY Preformed**—the safer wire rope. Being preformed, American Cable **TRU-LAY** is flexible—much easier to handle. It resists kinking and snarling. Worn and broken crown wires lie flat and in place, refusing to wicker out to puncture hands and possibly cause blood poisoning. Furthermore, being preformed, **TRU-LAY** will last longer than ordinary wire rope. It has far greater resistance to bending fatigue and that means reduced machine shutdowns for replacement—steadier production—greater dollar value. Do everything possible to reduce time-out accidents—everything possible to maintain high production. All American Cable Ropes made of Improved Plow Steel are identified by the Emerald Strand.

AMERICAN CABLE DIVISION

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Tacoma

AMERICAN CHAIN & CABLE COMPANY, INC.

BRIDGEPORT, CONNECTICUT

ESSENTIAL PRODUCTS . . . TRU-LAY Aircraft, Automotive, and Industrial Controls, TRU-LOC Aircraft Terminals, AMERICAN CABLE Wire Rope, TRU-STOP Brakes, AMERICAN Chain, WEED Tire Chains, ACCO Malleable Castings, CAMPBELL Cutting Machines, FORD Hoists, Trolleys, HAZARD Wire Rope, Yacht Rigging, MANLEY Auto Service Equipment, OWEN Springs, PAGE Fence, Shaped Wire, Welding Wire, READING-PRATT & CADY Valves, READING Electric Steel Castings, WRIGHT Hoists, Cranes, Presses . . . *In Business for Your Safety*

AN ELEVATOR, A CONVEYOR AND FEEDER IN A SINGLE UNIT

Bulk-Flo

CONSERVES IN MANY WAYS

Bulk-Flo is outstanding in its ability to cut handling costs and to conserve critical materials and save space. It minimizes breakage and degradation, prevents leakage and reduces explosion and fire hazards. The necessity for multiple elevating and conveying units is eliminated, because the same unit conveys horizontally, vertically or on an incline. Bulk-Flo is self-feeding, self-discharging and to a high degree of cleaning. It handles coal and other flowable materials under all conditions of load.

It loads automatically—at one or at several points—without feeders and discharges at the head end of vertical runs or at one or more points on horizontal runs, or as desired. Send for Book 2075.

LINK-BELT COMPANY

Chicago, Philadelphia, Pittsburgh, Wilkes-Barre, Huntington, W. Va., Denver, Kans.
Cleveland, Indianapolis, Detroit, St. Louis, Seattle, Toronto, Vancouver

Saves Space

Bulk-Flo is unusually compact, effecting a considerable saving in space requirements and supporting structure.

Self-Feeding, Enclosed

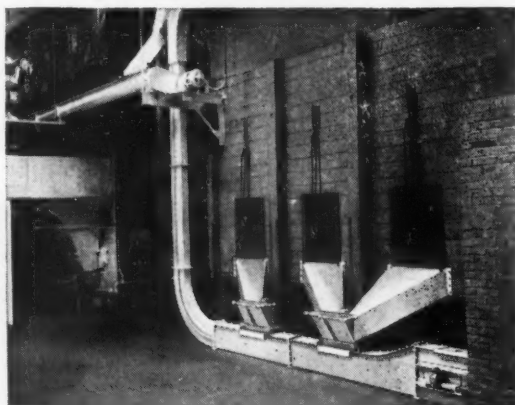
Bulk-Flo is self-feeding to capacity from bins, hoppers and chutes. It cannot flood. Material is moved in a dust-tight casing. It operates under partial loading with as high efficiency as when fully loaded.

More Flexible

Bulk-Flo can be laid out to carry vertically, along curves and on slants of any angle. Loading and discharge points can be located at almost any angle. Dem units can also be used.

Slow Speed

Because the material in a Bulk-Flo moves slowly, the speed is slow; usually 30 to 60 ft. per min. Larger capacities are obtainable by large section, rather than by speed.



Bulk-Flo conveyor-elevator-feeder handling coal in a power house. The Bulk-Flo transfers coal from bins near floor level to a screw conveyor which distributes it to stoker hopper.

9212



Above: Bulk-Flo unit handling fine coal from collector to storage bin at Southern Illinois. Air-tight, safe, takes up no more space than a

